NS 7000 Model 800 Series Hardware Manual

AUSPEX

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Trademarks

FCC Statement

WARNING: This equipment has been tested and found compliant with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency and, if not installed and used in accordance with the instruction manual, may cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Declaration of Conformity

The Auspex NetServers meet the following safety and EMC standards pursuant to ISO / IEC Guide 22 and EN 45014:

NetServer Model	Standards
NS 7000/800 Series NetServer: NS 7000/800 (base cabinet) NS 7000/080 (expansion cabinet) NS 7000/810 (base cabinet and expansion cabinet)	EN60950/1992 EN60950 A1/1993 EN60950 At2/1993 DIN VDE 0805 A1/11.91 EN55022 Class A (1985 Ed 1) EN50082-1 (Draft 1992) IEC801-2 (1991): ESD, 8 kv air, 4 kv contact IEC801-3 (1984): RS, 10 v/m, 1 kHz modulated IEC801-4 (1988): EFT, 2 kv A/C cables, 1 kv I/O cables IEC801-5 (Draft 1993): Surge, 2 kv diff, 4 kv comm

The NetServer complies with the requirements of the **Low Voltage Directive 73/23/EEC** and the **EMC Directive 89/336/EEC**. This equipment has been tested and found compliant pursuant to CISPR22 / 85 Class A.

Notice of VCCI Compliance

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Protection Against Electrostatic Discharge

To prevent damage to the system due to electrostatic discharge, always wear the antistatic wrist strap provided with your network server when you come in contact with the system.

Publication Change Record

The following table records all revisions to this publication. The first entry is always the publication's initial release. Each entry indicates the date of the release and the number of the system release to which the revision corresponds.

Part Number	Date	Description
850471-001 Rev A	November 1997	Release 1.9.2, first release

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Preface

About This Manual

This manual describes the Auspex NS 7000™ Model 800 Series NetServer™ and provides procedures for installing hardware components. It is intended for users who are familiar with computer equipment installation procedures and network cabling.

Before setting up the server or installing server components, Auspex recommends that you read this entire manual to familiarize yourself with the system.

The manual includes the following chapters and appendices:

- Chapter 1, “Overview of the NS 7000/800”
- Chapter 2, “Unpacking and Setting Up the System”
- Chapter 3, “Installation”
- Chapter 4, “Power On and Shut Down”
- Chapter 5, “Preventive Maintenance”
- Appendix A, “Drive Configuration Options”
- Appendix B, “Cable Specifications”
- Appendix C, “Configuring the System Console”

Related Documentation

The following Auspex documents contain additional information relevant to managing and maintaining Auspex NetServers:

- *System Manager’s Guide*, Auspex Systems, Inc.
- *Command Reference Guide*, Auspex Systems, Inc.
- Software Release Note, Auspex Systems, Inc.

Typographical Conventions

This guide uses typefaces to indicate different types of information. The following table explains the different typefaces.

Font	Meaning
`Typewriter`	Indicates literal screen messages.
Bold	In a command line, indicates information to be entered exactly as shown. In text, indicates a command name or device name.
Italics	In a command line, indicates a nonliteral item or variable for which you should substitute an appropriate value. In text, indicates a path name or emphasizes a special term.

Special Messages

This manual uses the following special messages and icons:

Warning: Warnings alert you to the danger of personal injury and call attention to instructions you must follow for your personal safety.

Caution: Cautions call attention to instructions you must follow to prevent damage to system hardware or software, or loss of system data.

Note: Notes call attention to important information you should be aware of as you follow the procedures outlined in this guide.

Recommendation: Recommendations call attention to an item or procedure that is not required but might help improve performance, ease of use, and ease of installation or configuration.

Tools

The tools icon identifies the tools you need to complete a task.

Terminology

Throughout this manual, certain terms refer to NetServer families generically. Where distinctions are necessary, the actual machine model is used.

The generic term...	Describes these models...
NS 7000/800	NS 7000 Model 800 Series NetServer
NS 7000/810	NS 7000 Model 800 Series NetServer with expansion cabinet
NS 7000/080	NS 7000 Model 080 expansion cabinet
NetServer or server	All models

Host Processor PROM monitor prompts are represented as "HP>" throughout this manual. Since this system prompt varies depending on the Host Processor model installed in the NetServer, the prompt that appears on your system might be different.

Contacting Auspex

Customer service and help using electronic mail are available to North American and International customers.

North America

You can reach Auspex customer service for North America 24 hours a day by dialing 1-800-3-AUSPEX (1-800-328-7739).

You can also obtain customer service support by sending electronic mail to support@auspex.com.

International

Customers within the countries or territory listed as follows can reach Auspex customer service 24 hours a day by dialing the provided telephone number:

Country or territory	Telephone number	Country or territory	Telephone number
Australia	1-800-121-194	Luxembourg	0800-2721
Austria	0-660-7912	Malaysia	800-4509
Belgium	0800-1-0180	Netherlands	06-0222158
Denmark	80-01-03-60	Norway	800-1-1294
France	0800-91-21-32 (0800-26-38-22)*	Philippines	1-800-116-0005
Germany	0130-81-8306	Poland	00-800-441-1220
Hong Kong	800-4803	Spain	900-95-4445
Ireland	1800 55 3343	Sweden	020-797326
Israel	177 440 9285	Switzerland	0800-55-1339
Italy	1678-73541	Taiwan	0080-14-9580
Japan	0044-22-12-2414	United Kingdom	0800-28-7739
Korea	0038-13-0374		

* France has two toll-free numbers. The number in () is directed to the Paris office during the working day.

Customers within the locations listed can also obtain help through electronic mail at the addresses listed under the “North America” section.

All other international customers should contact their authorized Auspex distributor.

Technical Publications

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http://www.auspex.com

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1 Overview of the NS 7000/800

Overview

Auspex NetServers deliver industry-leading system response time, throughput, and reliability to meet the needs of large network environments. The patented Functional Microprocessing® (FMP®) architecture distributes file system workloads to multiple, dedicated system processors individually optimized for network, file, storage, and UNIX system functions. The FMP architecture also provides enhanced user productivity over traditional servers by delivering higher data availability, increased data accessibility, and reduced administrative costs through data consolidation.

Enhanced disk, power, and storage subsystems make Auspex NetServers capable of operating efficiently under a variety of conditions and environments.

Figure 1-1 on page 1-2 illustrates the Auspex NS 7000/800 Series NetServer.

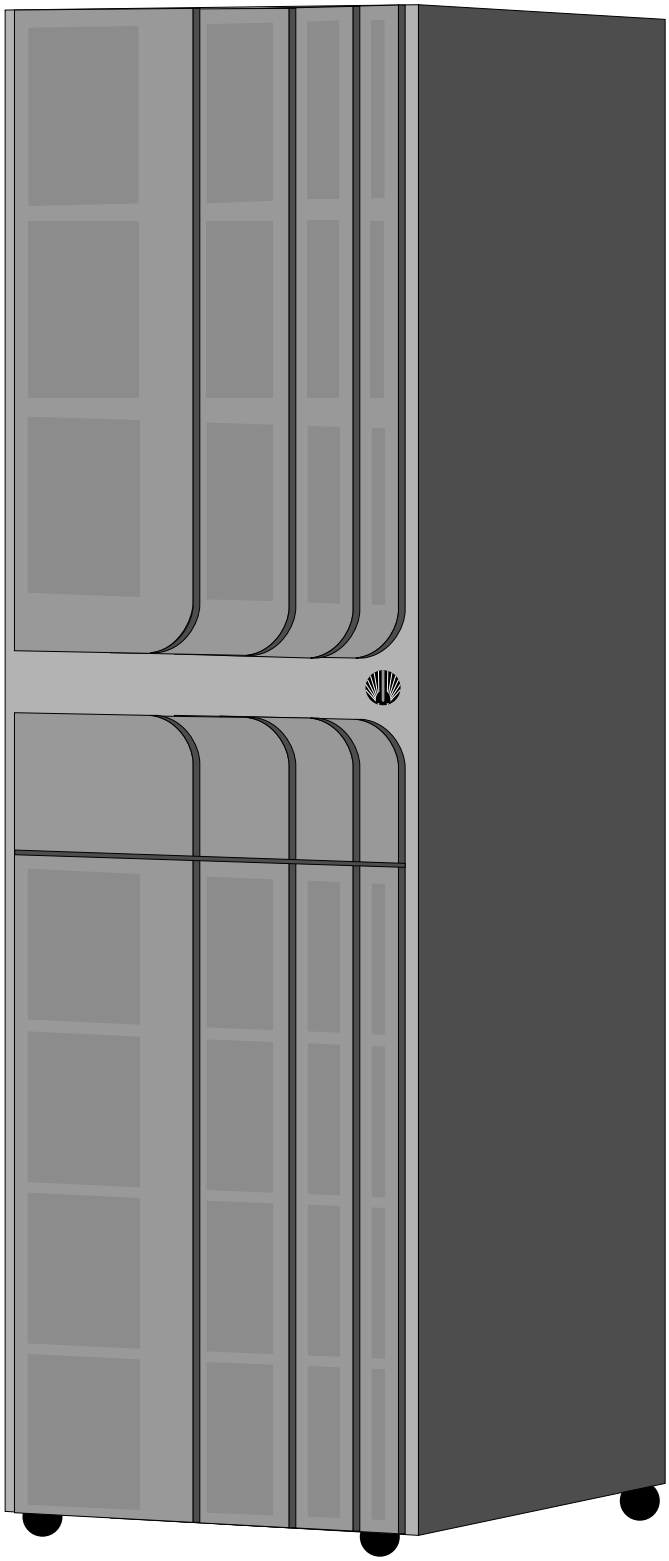


Figure 1-1. NS 7000/800 Series NetServer

Table 1-1 lists the hardware features available with the NS 7000/800.

Table 1-1. NS 7000/800 NetServer hardware features

Feature	Description
System architecture	▲ FMP architecture with dedicated system processors for file, network, and storage processing. ▲ Write Accelerator III board with the SP V for improved network file system operations.
VME backplane	▲ 14-slot card cage for installing the processor boards.
Enhanced disk subsystems	▲ High-Density Disk Array (HDDA) chassis consisting of four drive drawers, each supporting up to seven disk drives and one Disk DC Converter (DCC). ▲ Seven-slot drive rack to support the root drive, CD-ROM, and optional tape drives.
Enhanced power subsystems	▲ 48-volt bulk power supplies, providing optional N+1 redundancy to the HDDA chassis; meaning if one power supply fails, the other power supplies maintain power while the failed power supply is replaced. ▲ Disk DC Converter (DCC) for converting the 48-volt bulk power into 5-volt and 12-volt power for the disk drives in the drive drawer.
Storage subsystems	▲ Tape storage systems that can be attached to the HP or SP boards. For information on supported tape storage systems, refer to the *Storage Peripherals Manager's Guide*.
Networking*	▲ Support for 100Base-T Ethernet, Quad 10Base-T Ethernet, Quad 10/100Base-T Ethernet, FDDI, and ATM network interfaces.
System console	▲ ANSI-compatible system console for monitoring system activity.

* Contact your Auspex sales representative for the latest information on supported network interfaces.

Figure 1-2 illustrates the NetServer's Functional Multiprocessing architecture. For more information on NetServer operation, refer to the *System Manager's Guide*.

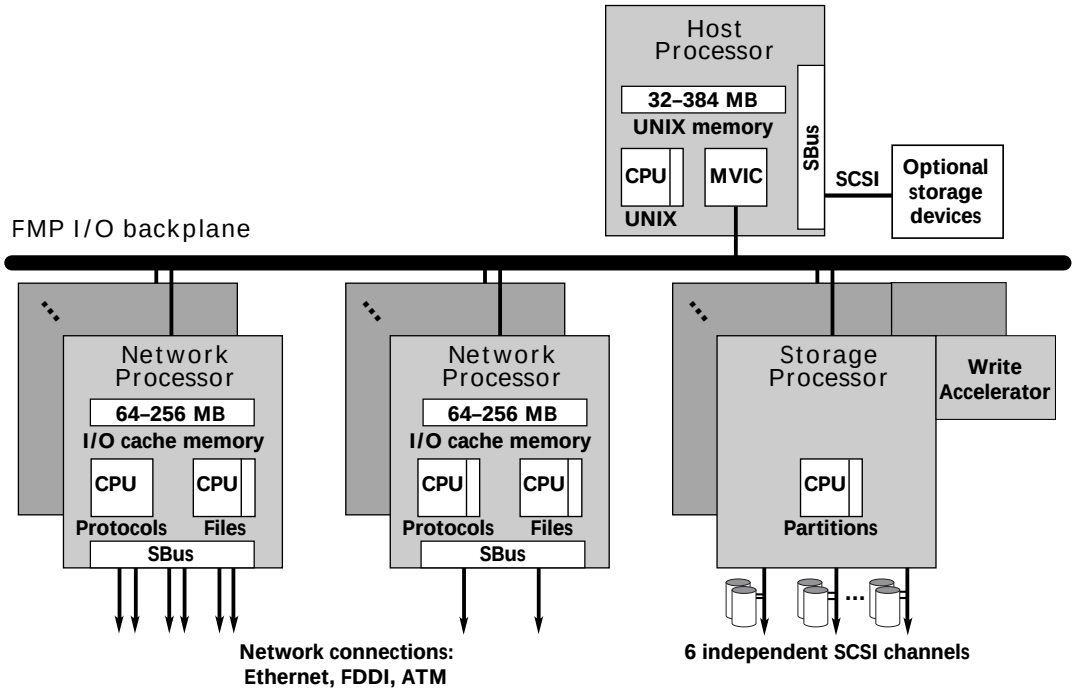


Figure 1-2. NS 7000/800 FMP architecture

Processor Board Configurations

Table 1-2 lists the supported processor board configurations for the NS 7000/800.

Table 1-2. NS 7000/800 processor board configurations

Processor board	Minimum configuration	Maximum configuration	Description
Host Processor (HP VIII)	1	1	SPARC CPU Host Processor supporting up to 384 MB of memory. For more information on HP VIII memory configurations, see Table 2-1 on page 2-13.
Network Processor (NP IV)	1	5	Dual SPARC CPU Network Processor supporting up to 256 MB of memory. For more information on NP IV memory configurations, see Table 2-3 on page 2-17. For a list of supported network interfaces, refer to Table 2-2 on page 2-15.
Storage Processor (SP V)	1	5	Storage Processor providing six SCSI channels for connecting disk, tape, and CD-ROM drives.

Disk Subsystems

The NS 7000/800 base cabinet houses two types of disk subsystems:

- Seven-Slot Drive Rack
- High-Density Drive Array (HDDA)

Each of these disk subsystems is described as follows.

Seven-Slot Drive Rack

The seven-slot drive rack supports any combination of disk, tape, and CD-ROM drives, with one drive configured as the root drive. Each NS 7000/800 base cabinet supports only one seven-slot drive rack.

Note: NS 7000/080 expansion cabinets do not support seven-slot drive racks.

High-Density Disk Array (HDDA)

Each NS 7000/800 base cabinet supports up to two HDDA chassis. Each HDDA chassis supports up to four individual drive drawers. Each drive drawer supports up to 7 disk drives for a maximum of 28 disk drives per HDDA chassis. The drive drawer configuration increases drive density in the NetServer and reduces the physical space needed for a high-capacity server.

Note: The drive drawers support disk drives only. They do not support CD-ROM or tape drives.

For additional disk storage you can add an expansion cabinet, which supports up to five HDDA chassis. The maximum number of drives supported in a fully configured NS 7000/800 NetServer is 203 (or 20 drive drawers).

Power Subsystems

The NS 7000/800 has three types of power subsystems:

- Main
- 48-volt bulk
- Disk DCC

The NetServer power subsystems provide flexibility to build and scale system storage solutions to meet individual requirements.

The design of the NetServer power subsystems also offers optional "N+1" redundancy for two of the three power subsystems: the base cabinet main power and the 48-volt bulk power for the HDDAs. N+1 redundancy means that for a specific configuration, a single power supply can fail without interrupting system operation. Power supply redundancy also offers the ability to hot plug power supplies in the event of a failure.

The main power supplies in the base cabinet convert AC voltage to DC voltage for the card cage processor boards and seven-slot drive rack. The base cabinet comes standard with two main power supplies. For redundancy, you need to add an additional main power supply. The maximum number of main power supplies in the base cabinet is three.

The bulk power supplies convert the 240-volt power into 48-volt power for distribution to the drive drawer Disk DCCs. Each NS 7000/800 NetServer shipped from Auspex is configured with the same number of bulk power supplies as there are HDDA chassis. For example, the base cabinet comes standard with one HDDA chassis, one drive drawer, and one bulk power supplies—one supply for each HDDA chassis. For redundancy, you need to add an additional power supply. The maximum number of bulk power supplies in the base cabinet is three. The maximum number of bulk power supplies in an expansion cabinet is six.

The custom design and packaging of the Disk DCC power subsystems provides the flexibility to build and scale drive storage requirements to site requirements because Disk DCC power is added as you add drive drawers. Each Disk DCC converts the 48-volt bulk power into 5-volt and 12-volt power for the HDDA disk drives.

For more information on power subsystem configuration, refer to "Power Supply Configurations" on page 2-19. For information on power subsystem maintenance, refer to "Power Subsystem Operation" on page 5-2. Complete environmental specifications for the NS 7000/800 are provided later in this chapter.

Numbering Conventions

Table 1-3 describes the numbering conventions for each element in the NetServer.

Table 1-3. NS 7000/800 numbering conventions

NetServer element	How numbered	Numbering convention
Card cage/ VME backplane	1–14	The HP board is always installed in slots 1 and 2. The NP and SP boards are installed thereafter and occupy one double slot or two single slots each. A maximum of 5 NP boards and 5 SP boards are supported per system.
Seven-slot drive rack	ad0–ad6	Drives in the seven-slot drive rack are numbered from left to right. The first drive (ad0) is always installed in slot 0, and is configured as the root drive.
HDDA chassis	1–2 (base cabinet) 1–5 (expansion cabinet)	HDDA chassis are numbered from bottom to top in both the base cabinet and expansion cabinet.
HDDA drive drawers	1–4	Each HDDA chassis supports up to four drive drawers. Each drive drawer supports up to 7 disk drives and 1 Disk DCC per drawer.
HDDA disk drives	ad7–ad63 (base cabinet) ad64–ad203 (expansion cabinet)	HDDA drives are numbered consecutively starting with ad7 (slot 7). Refer to “Sample Drive Configurations” on page A-5 for an example of drive drawer numbering.

For information regarding specific locations and setup of NetServer components and subassemblies, refer to Chapter 2.

Environmental Requirements

Operate the NetServer in a temperature-controlled, contaminant-free atmosphere within the recommended levels of humidity.

Table 1-4 lists the environmental requirements for the NS 7000/800.

Table 1-4. NS 7000/800 environmental requirements

Environmental requirements	Minimum	Maximum
Operating temperature	5°C (40°F)	35°C (95°F)
Storage temperature	0°C (32°F)	65°C (150°F)
Operating altitude	0 m (0 ft.)	2,150 m (7,000 ft.)
Storage altitude	0 m (0 ft.)	12,000 m (40,000 ft.)
Operating humidity (noncondensing at 40°C)	20%	80%
Nonoperating humidity (noncondensing at 40°C)	10%	90%
Acoustics (sound power)	N/A	Less than 7.5 dBA bels (LwA)

Caution: For proper air flow and EMI reduction, operate the NetServer with the doors closed and all access panels in place.

Note: The NetServer can operate at an altitude of up to 3,000 m (10,000 ft.). However, the maximum operating temperature at an altitude between 2,150 m (7,000 ft.) and 3,000 m (10,000 ft.) is 30°C (86°F).

Space Requirements

Place the NetServer base cabinet in a location no less than 3-feet from the nearest wall or other equipment. Three feet of clearance allows easy access to the server and permits adequate air flow around the equipment.

If your NetServer includes an expansion cabinet, you must allow enough space for the base cabinet and expansion cabinet to stand side by side.

Table 1-5 lists the dimensions of the NetServer base cabinet and optional expansion cabinet. The weights shown are for fully configured cabinets.

Table 1-5. NS 7000/800 space requirements

Dimension	Base cabinet	Expansion cabinet
Height	197 cm (77 inches)	197 cm (77 inches)
Width	61 cm (24 inches)	61 cm (24 inches)
Depth	101 cm (39.5 inches)	39.5 inches (101 cm)
Weight	408 kg (900 lbs.)	508 kg (1120 lbs.)

Electrical Requirements

The NetServer requires an electrical power source that is free of electrical power surges and must be adequately grounded to protect it from EMI during operation.

Caution: If you have an expansion cabinet connected to the base cabinet, the expansion cabinet must be powered from a different electrical circuit than the base cabinet.

Maintaining proper environmental humidity also helps reduce the risk of electrostatic damage.

Warning: The wiring at your site must provide for ground fault protection. Avoid installation during lightning storms.

Tables 1-6 and 1-7 list the electrical power requirements and electrical specifications for the base cabinet and expansion cabinet.

Table 1-6. NS 7000/800 power requirements

Base cabinet	Expansion cabinet
2,600 VA	3,650 and 4,400 VA
9,050BTUs/Hour	12,450 BTUs/Hour

Caution: The base cabinet and expansion cabinet accept a nominal input voltage range of 200–240 VAC only.

Table 1-7. NS 7000/800 power specifications

Specification	Base cabinet	Expansion cabinet
Nominal input voltage range	200–240 VAC	200–240 VAC
Operating input voltage range	180–264 VAC	180–264 VAC
Current rating	16 A	24 A
Input service rating	20 A	30 A
Frequency	50–60 ±3 Hz	50–60 ±3 Hz
Inrush current	20 A peak maximum per power supply	30 A peak maximum per power supply
Power factor	0.98	0.98
Leakage current	3.5 mA (maximum)	3.5 mA (maximum)

Power Cables

This section describes the power cables shipped with the NS 7000/800.

North America, Canada, and Mexico

For North America, Canada, and Mexico the base cabinet and expansion cabinet are shipped with 3-12 gauge L6-20 and L6-30 power cables. The wall outlet must be on a 20-amp for the base cabinet or a 30-amp circuit for the expansion.

Figure 1-3 shows an outline of the L6-20 and L6-30 power plugs.

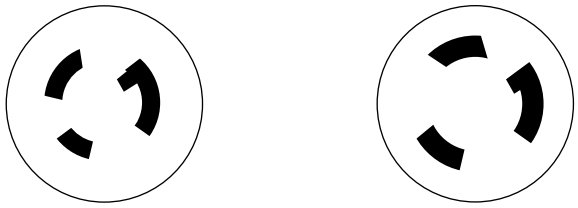


Figure 1-3. Outline of the L6-20 and L6-30 power plugs

International

For International configurations, the NetServer is shipped with a TUV-approved 3x1.50-mm cable, which meets the specifications outlined in the HD21 code H05VVF3G1.50.

2 Unpacking and Setting Up the System

About This Chapter

This chapter provides instructions for unpacking and setting up the NetServer base and expansion cabinet and includes information to help you familiarize yourself with the NetServer's components.

The following sections are covered in this chapter:

- Unpacking the NetServer
- Stabilizing the Cabinet
- Opening the Cabinet Doors
- NetServer Components
- Base Cabinet Subassemblies
- Expansion Cabinet Subassemblies
- Card Cage Components
- Processor Board Slot Assignments
- Power Supply Configurations

This chapter does not provide instructions for installing boards in the card cage or connecting an expansion cabinet to the base cabinet. If you need to install a board in the card cage or connect an expansion cabinet to the base cabinet, contact your authorized Auspex service representative.

Unpacking the NetServer

This section provides unpacking procedures for the NetServer base cabinet, expansion cabinet, and HDDA drive drawers. This procedure varies depending on the shipping method and packing materials used.

NetServers delivered to destinations within the continental United States are usually shipped by truck. NetServers delivered to destinations outside the continental United States are shipped by air.

Warning: Do not attempt to move or uncrate the base cabinet unless you have others to assist you. You need at least one person to help you uncrate the expansion cabinet. Any attempt by one person to uncrate the base or expansion cabinet could result in injury.

Tools

- Knife or other sharp object
- Wire cutter
- Crescent wrench
- #1 Phillips screwdriver

If the server is in a crate, you need the following:

- 9/16-inch wrench
- Band or wire cutter

To unpack a NetServer shipped by truck

1. Place the NetServer base cabinet in its designated location.

   For easy access and proper air circulation, make sure there is at least three feet of clearance between the server and any wall or other equipment (except the expansion cabinet). Also, make sure there is a wall receptacle within six feet of the server and a telephone jack (for modem users) within seven feet of the base cabinet. The wall receptacle must be on a 20-amp circuit.

2. Remove packing material from the base cabinet by sliding it up and off the unit. To avoid damaging the unit, do not cut the packing material with a knife.

3. If your NetServer includes an optional expansion cabinet:

   a. Place the expansion cabinet to the left of the base cabinet (when viewed from the front).

   b. Remove packing material as described in step 2.

Note: To connect the expansion cabinet to the base cabinet, contact your authorized Auspex service representative.

Note: If the surface of the server becomes marked or smudged, use a nonabrasive stainless-steel cleaner to clean the surface.

Be sure to allocate enough space for this procedure.

To unpack a NetServer shipped by air

1. Use a 9/16-inch wrench to remove the seven bolts securing the side panels of the crate to its base.
2. Turn the six latch locks counterclockwise to release the locks securing the packing crate's front panel. After releasing the locks, carefully lower the panel to the ground. Keep the panel nearby. It will be used in step 5 as a ramp to roll the server off the base of the crate.
3. Slide the panels off the server, and move them aside.
4. Cut and remove the straps that secure the server to the base of the crate.
5. Place the ramp (the panel removed in step 2) next to the edge of the crate, adjacent to the back panel of the server. At the lower end of the ramp, fold out the ramp extension to make a smooth transition from ramp to floor.
6. Carefully roll the server down the ramp to the floor.

Caution: Make sure that the high end of the ramp is slightly lower than the base of the crate, or the server's casters may move the ramp out of position as you roll it onto the ramp. Also, check that the leveling feet clear the upper edge of the ramp extension. If the feet catch on the extension, the cabinet can fall off the ramp.

7. Remove the plastic packing material from the server by sliding it up and off the unit.
8. To avoid damaging the unit, do not cut the plastic packing material with a knife.
9. Before proceeding further, roll the server to the site prepared for it.

   For easy access and proper air circulation, make sure there is at least three feet of clearance between the server and any wall or other equipment (except the expansion cabinet). Also, make sure that there is a wall receptacle within six feet of the server and a phone jack (for modem users) within seven feet of the base cabinet. The wall receptacle must be on a 16-amp circuit.
10. If your NetServer includes an optional expansion cabinet, repeat steps 1 through 9 to unpack it. Place the expansion cabinet to the left of the base cabinet (when viewed from the front).

Note: If the surface of the server becomes marked or smudged, use a nonabrasive stainless-steel cleaner to clean the surface.

This completes the procedure for unpacking a NetServer shipped by air.

To unpack an HDDA drive drawer

1. Using a knife or other sharp tool, remove the drive drawer from its shipping container.
2. Remove the black rubberbands securing the packing material, and put in a safe place.

Caution: Do not cut the black rubberbands. You need them in case the drive drawer needs to be returned to Auspex.

3. Cut the red tie-wraps securing the drive drawer handle(s) on the front of the base cabinet, and set the handle aside for future use.
4. Locate the NetServer power cable, remove the drive drawer key, and set aside.

Note: Two base cabinet door keys are also attached to the power cable. These keys are described in “Opening the Cabinet Doors” on page 2-5.

This completes the procedure for unpacking an HDDA drive drawer. Refer to Chapter 3, for NetServer installation procedures.

Stabilizing the Cabinet

The NetServer is shipped with casters so you can easily move the server to its location. Once you move the server to its location, you must level and stabilize it. The following procedure is the same for both the base cabinet and expansion cabinet.

To stabilize the cabinet

1. Locate the cabinet stabilizers underneath each corner of the cabinet.
2. Using an adjustable wrench, lower each stabilizer by rotating the locking nut in a clockwise direction until the system is lifted 1/8-inch off the casters (see Figure 2-1).

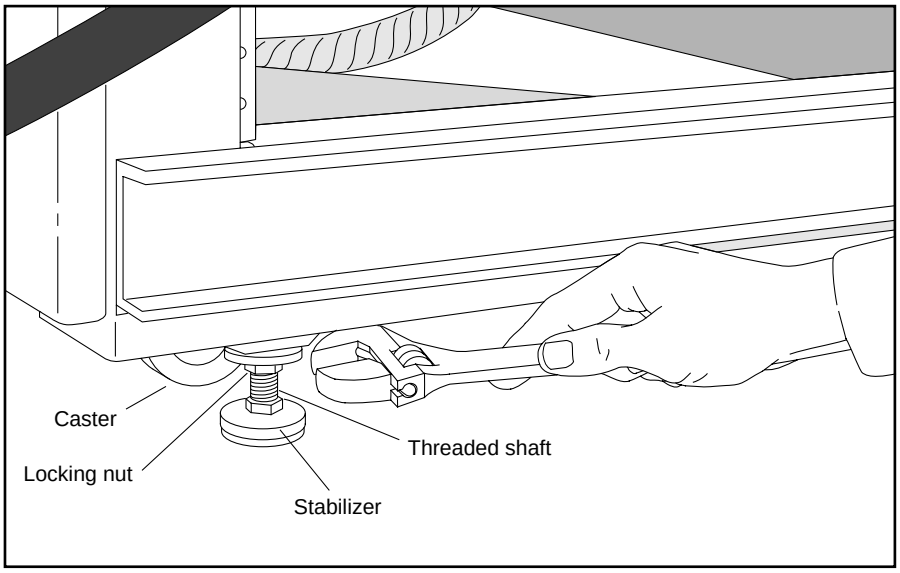


Figure 2-1. Stabilizing the cabinet

3. Turn the locking nut counterclockwise until it reaches the top of the threaded shaft, and tighten it to lock the stabilizer foot in position. Make sure the foot does not turn as you tighten the locking nut.

This completes the procedure for stabilizing the cabinet.

Opening the Cabinet Doors

The NetServer has two duplicate keys tie-wrapped to the power cable. The keys open both the front and back doors of the base cabinet. If your NetServer includes an expansion cabinet, the key also opens its front and back doors. Once the doors are unlocked, you can open and close them without a key.

NetServer Components

After unpacking and stabilizing the NetServer, make sure you have the following:

- HDDA drive drawers (one minimum) packed separately in foam-padded boxes with disk drives pre-installed per each NetServer configuration
- Disk (one minimum) and CD-ROM (one minimum) drives packed separately in foam-padded boxes for installing in the seven-slot drive rack
- Documentation set, including:
  - *NS 7000 Model 800 Series Hardware Manual* (this manual)
  - *System Manager's Guide*
  - *System Manager's Quick Reference*
  - *Command Reference Guide*
  - Software release note
- System console
- Modem cable
- Power cable

Instructions for connecting cables appear in Chapter 3, sections "Grounding the NetServer," "Connecting the System Console to the Server," "Attaching SCSI Devices," and "Connecting the NetServer to the Network."

If you ordered an expansion cabinet, make sure you have the following:

- Connection kit
- HDDA drive drawers (one minimum) packed separately in foam-padded boxes with disk drives pre-installed per each NetServer configuration
- Storage Processor V
- 48-volt power supply
- Power cable

Note: Contact your authorized Auspex service representative to connect the expansion cabinet to the base cabinet.

Base Cabinet Subassemblies

The NS 7000/800 base cabinet has the following subassemblies:

- 14-slot card cage chassis
- Seven-slot drive rack (one)
- HDDAs (up to two)
- Power distribution unit (PDU)
- Main power supply enclosure with one to three power supplies installed offering a nonredundant or optional redundant configuration
- 8-slot bulk power chassis with up to three bulk power supplies installed for distributing power to the HDDA drive drawers.

Figures 2-2 and 2-3 show the front and the back views of the base cabinet with the subassemblies labeled.

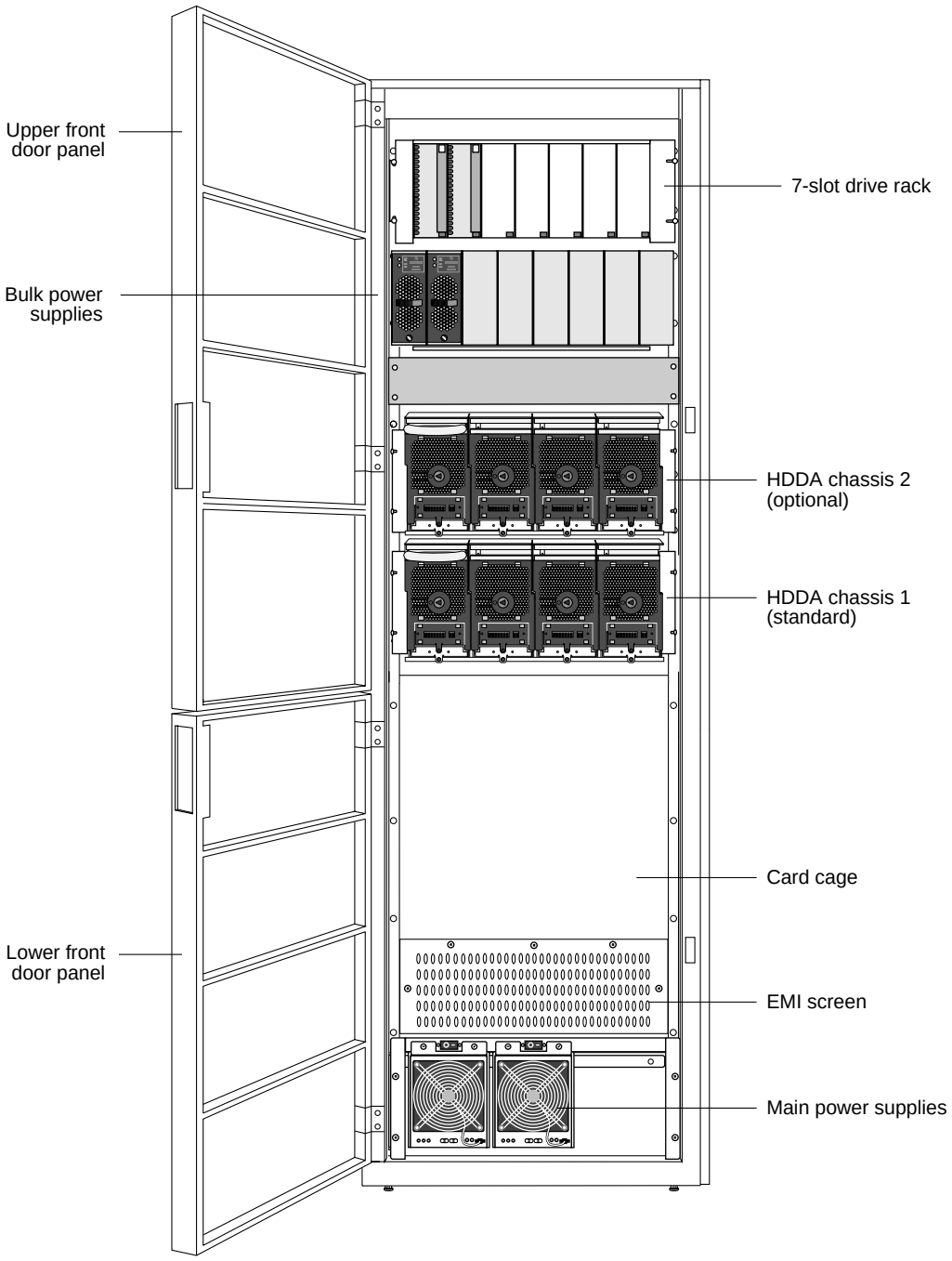


Figure 2-2. Base cabinet subassemblies (front view)

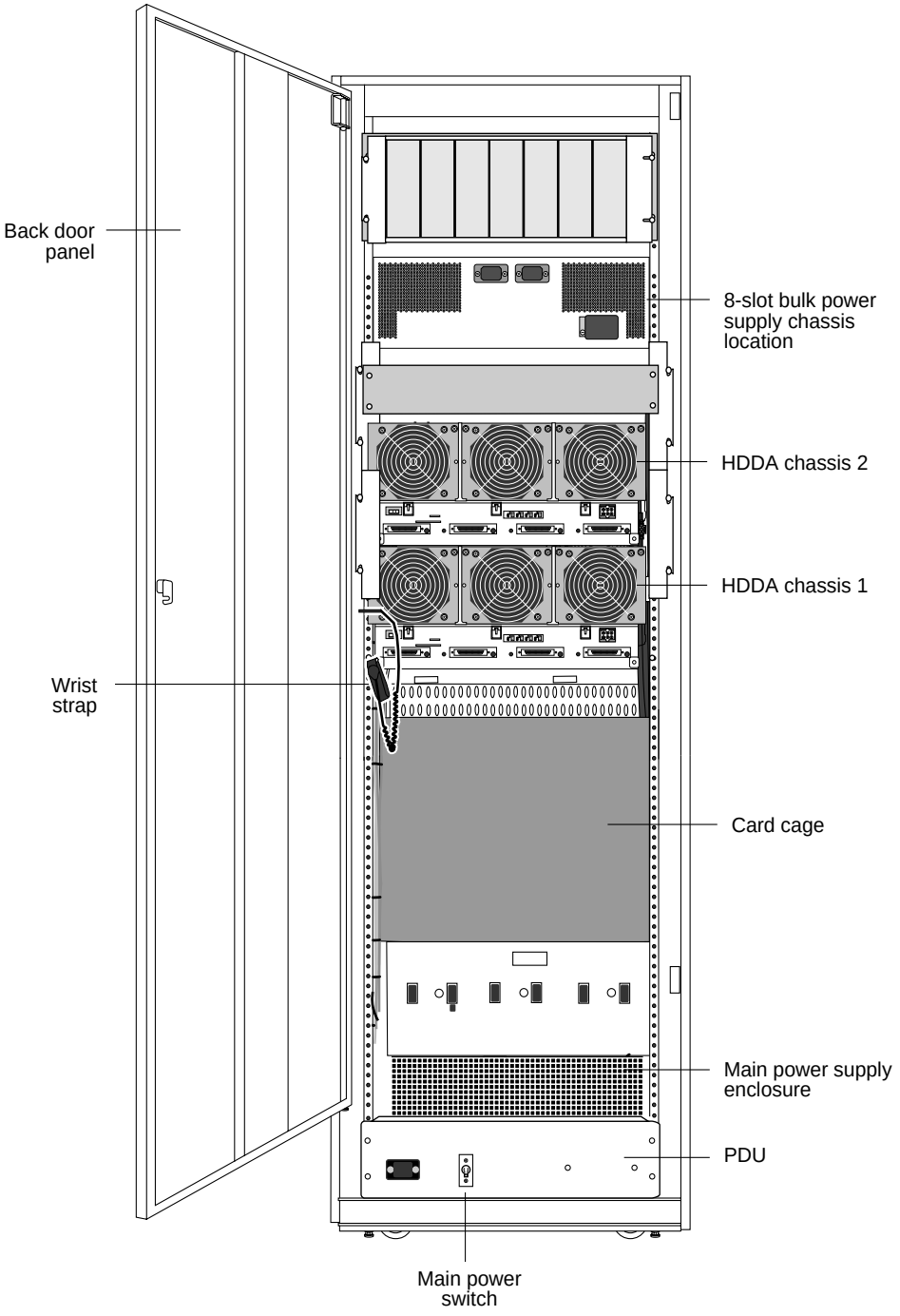


Figure 2-3. Base cabinet subassemblies (back view)

Expansion Cabinet Subassemblies

The expansion cabinet contains the following subassemblies:

- HDDAs (up to five)
- Power distribution unit (PDU)
- 8-slot bulk power chassis with up to six bulk power supplies installed for distributing power to the HDDA drive drawers.

Figures 2-4 and 2-5 show the front and back views of the expansion cabinet. Figure 2-4 is shown with an optional bulk power supply installed to achieve N+1 redundancy.

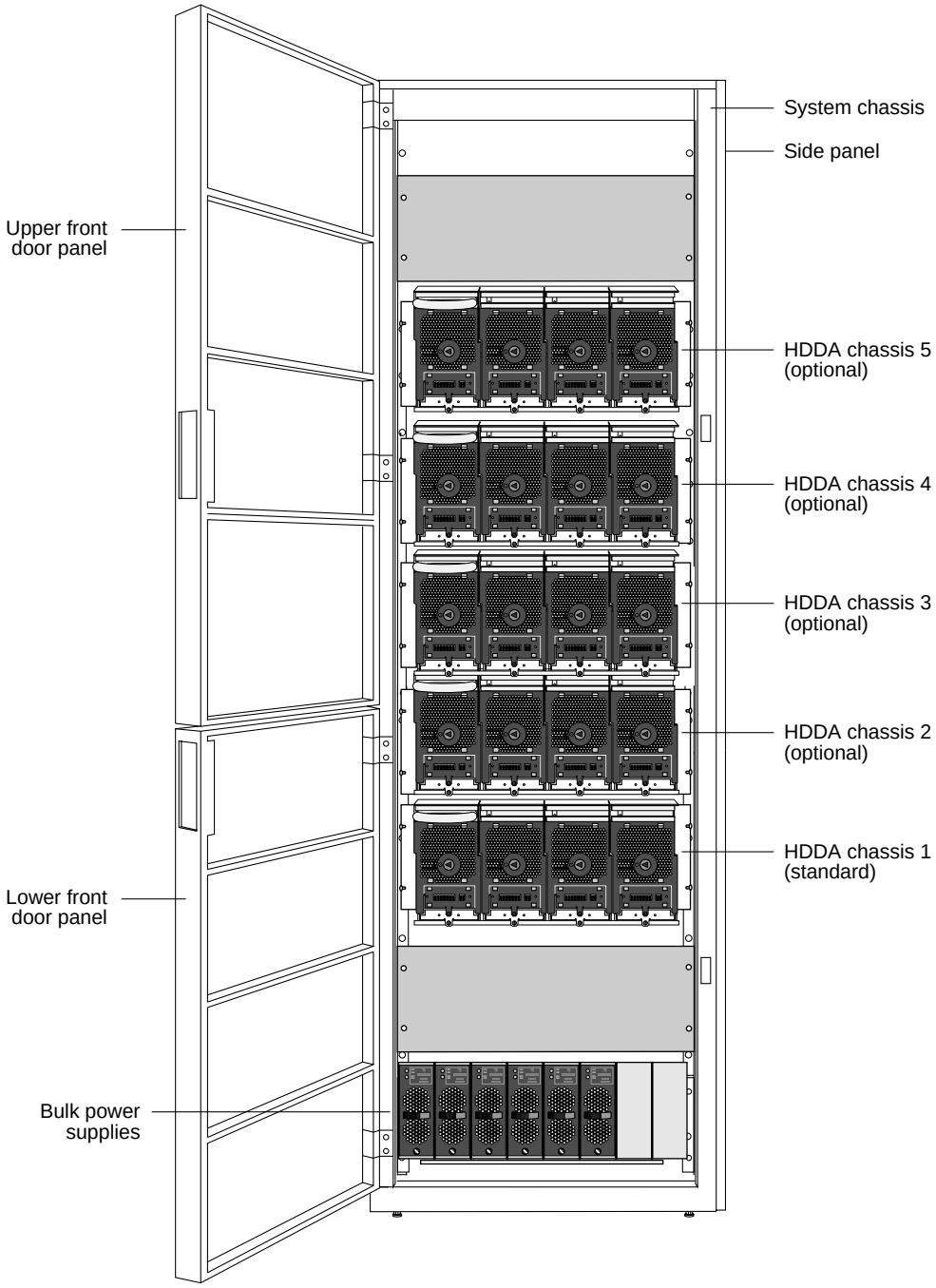


Figure 2-4. Expansion cabinet (front view)

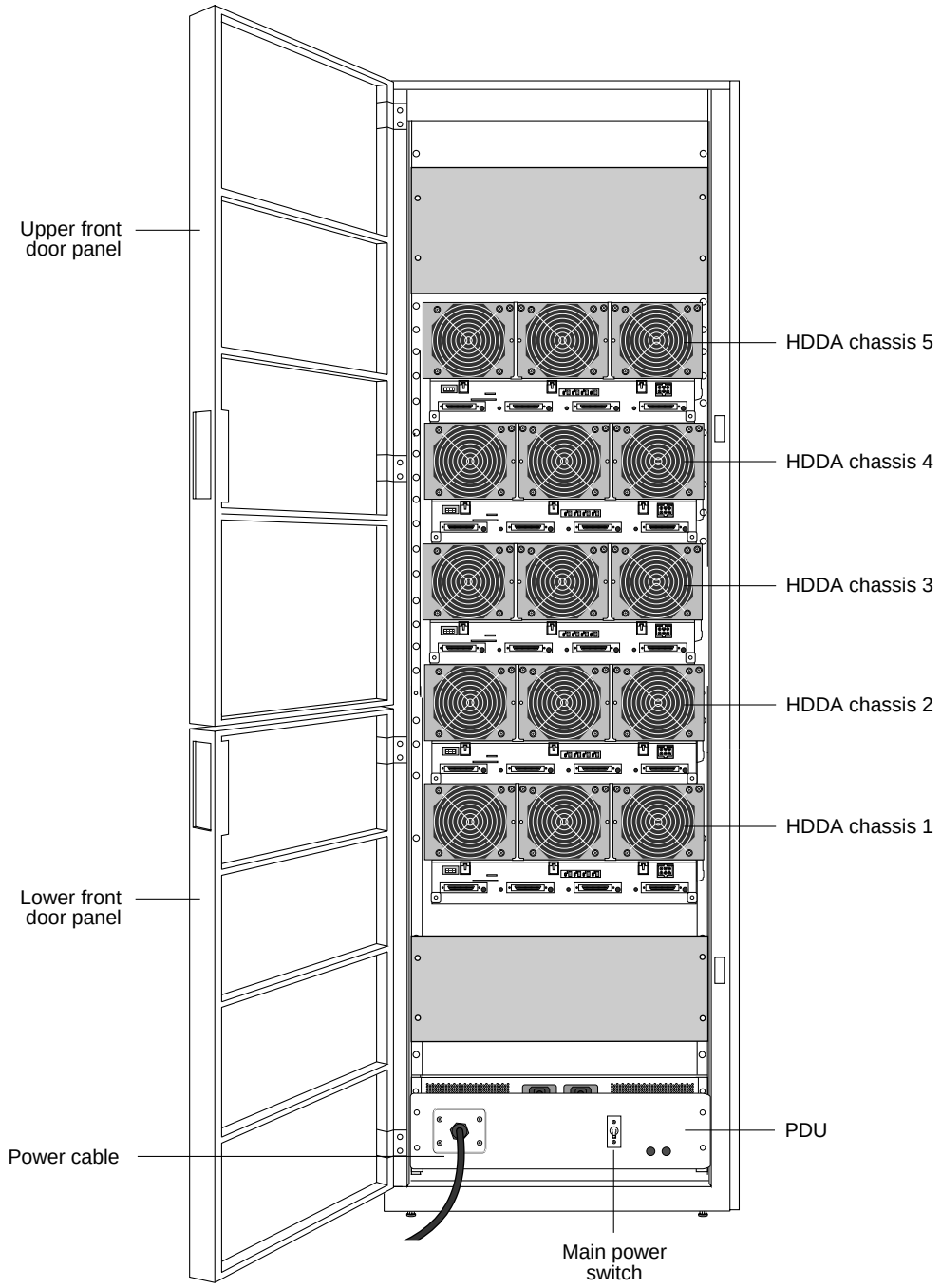


Figure 2-5. Expansion cabinet (back view)

Card Cage Components

The NS 7000/800 card cage houses the following VME compatible printed-circuit boards:

- Host Processor (one)
- Network Processor (up to five)
- Storage Processor (up to five)

Each of these boards, their functions, and minimum and maximum configurations are described as follows.

HP VIII

The HP VIII has the following features:

- 125-MHz SPARC CPU processor
- Two or four memory modules of 32 to 128 MB each for up to 384 MB of host memory (see Table 2-1).
- Support for up to three SBus cards (except ATM): two masters and one slave SBus slot.

Note: The HP supports three single, one double and one single, or one triple SBus card.

- Serial connections to the TTYA and TTYB ports.
- Integrated Mbus design allowing future upgrades to the CPU.
- Support for up to seven SCSI devices on one SCSI port.

Table 2-1 lists the memory configurations for the HP.

Table 2-1. HP memory configurations

No. of 32-MB memory modules	No. of 64-MB memory modules	No. of 128-MB memory modules	Total memory (MB)
0	2	0	128
2	2	0	192
0	4	0	256
0	0	2	256
2	0	2	320
0	2	2	384

Note: HP memory modules must be installed in pairs of the same capacity.

Figure 2-6 illustrates the HP front panel.

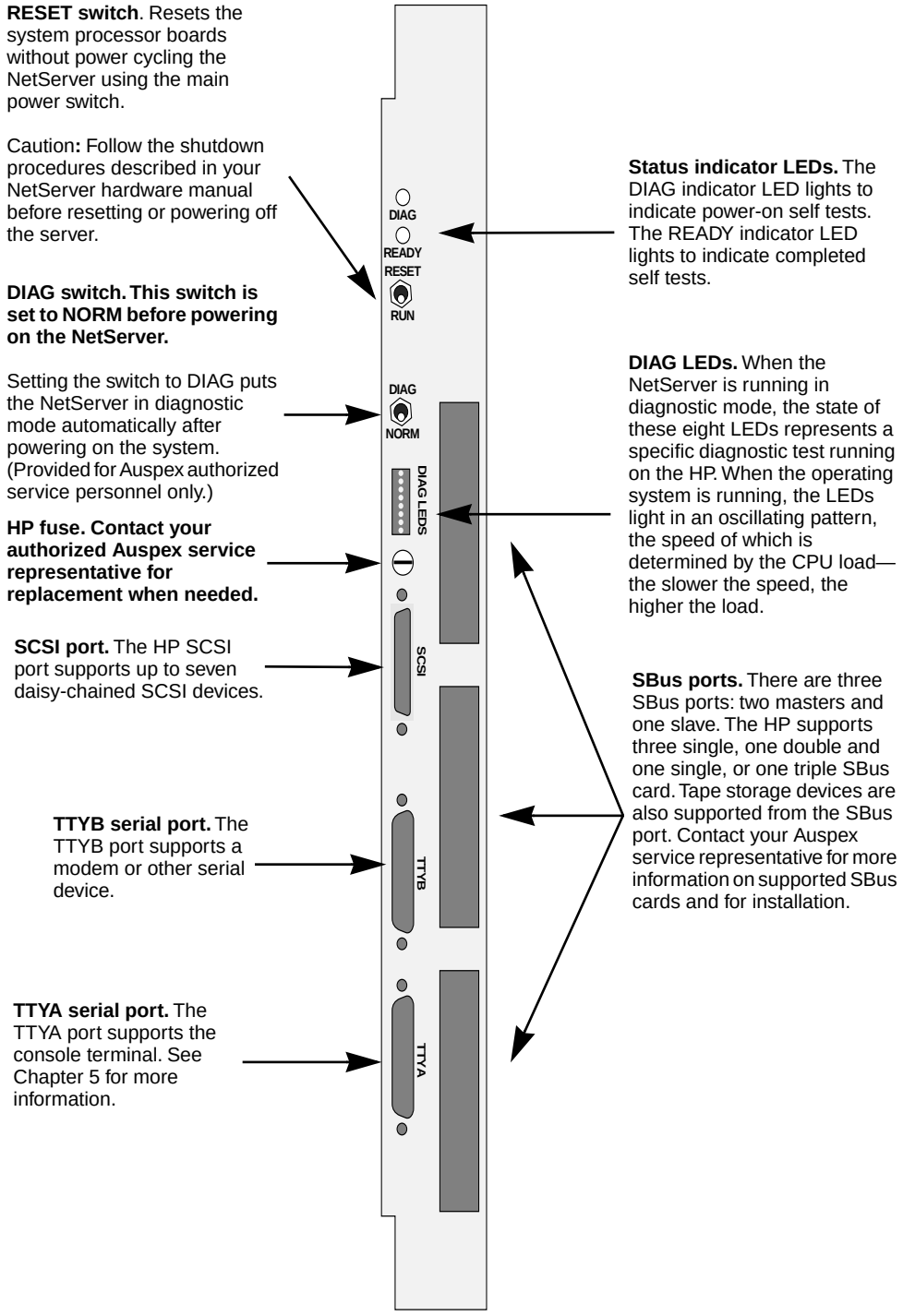


Figure 2-6. HP front panel

NP IV

The NP IV has the following features:

- 128 to 256 MB of memory
- 100 MB-per-second VME transfer speed when operating in conjunction with SP V
- Support for the following network interfaces:
  - 100Base-T Ethernet
  - ATM (fiber or UTP)
  - FDDI-DAS (fiber)
  - FDDI-SAS (fiber or MLT-3)
  - Quad Ethernet
  - Quad 10/100Base-T Ethernet

Note: Contact your Auspex sales representative for the latest information on supported network interfaces.

Table 2-2 lists the supported network interface configurations.

Table 2-2. Network interface configurations

Number and type of network interfaces supported*
1 to 3 FDDI-SAS (fiber or MLT-3)
1 FDDI-DAS
1 to 3 100Base-T Ethernet (half or full duplex)
1 to 3 ATM (fiber or UTP)
1 to 3 Quad Ethernet
1 100Base-T Ethernet (half or full duplex), 1 Quad Ethernet
2 100Base-T Ethernet (half or full duplex), 1 Quad Ethernet
1 100Base-T Ethernet (half or full duplex), 2 Quad Ethernet
1 FDDI-SAS (fiber or MLT-3), 1 Quad Ethernet
1 FDDI-SAS (fiber or MLT-3), 2 Quad Ethernet
2 FDDI-SAS (fiber or MLT-3), 1 Quad Ethernet
1 FDDI-DAS, 1 Quad Ethernet
1 ATM, 1 Quad Ethernet
2 ATM, 1 Quad Ethernet
1 ATM, 2 Quad Ethernet
1 Quad 10/100Base-T Ethernet
1 Quad 10/100Base-T Ethernet, 1 Quad Ethernet
1 Quad 10/100Base-T Ethernet, 2 Quad Ethernet

* Each Quad Ethernet SBus card has four 10Base-T Ethernet ports.

Figure 2-7 shows an example of mixed network interfaces on NP boards.

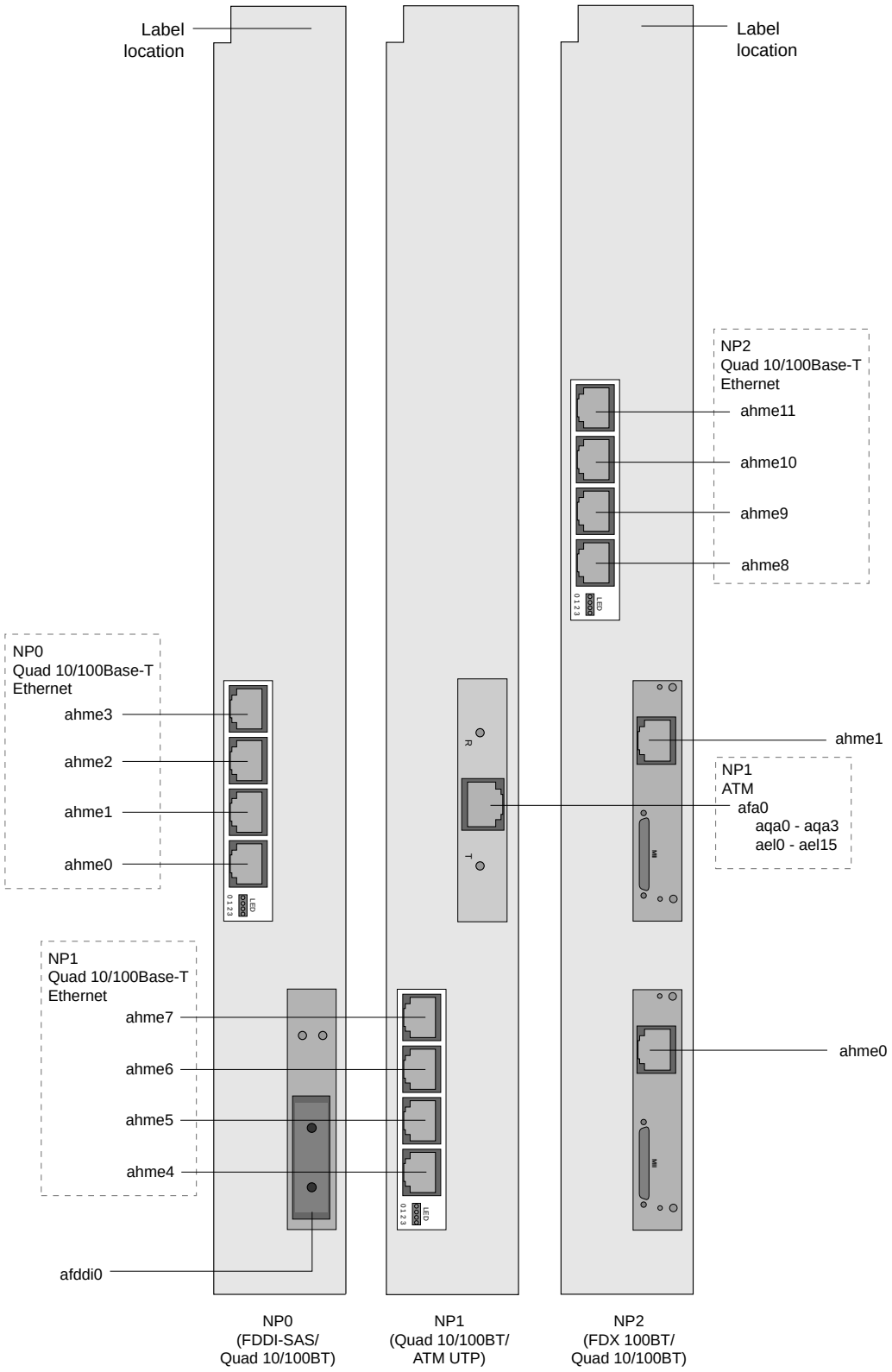


Figure 2-7. Example of mixed network interfaces on NP boards

The NP IV supports up to 256 MB of memory for protocol, file, and I/O processing. Each NP IV has four or eight SIMMs of either 16 or 32 MB each.

Table 2-3 lists the memory configurations for the NP IV.

Table 2-3. NP IV memory configurations

No. of 16-MB SIMMs	No. of 32-MB SIMMs	Total memory (MB)
0	4	128
4	4	192
0	8	256

Note: NP SIMMs must be installed in groups of four or eight of the same capacity.

SP V

The NS 7000/800 supports up to five SP V boards. Each SP V has six SCSI channels for connecting disk, tape, and CD-ROM drives. A Write Accelerator III board, with 8 MB of memory is added to enhance NFS write operations.

The SP V has a VME transfer speed of up to 100 MB per second when operating in conjunction with NP IV.

Figure 2-8 shows a card cage configuration with system processor connections.

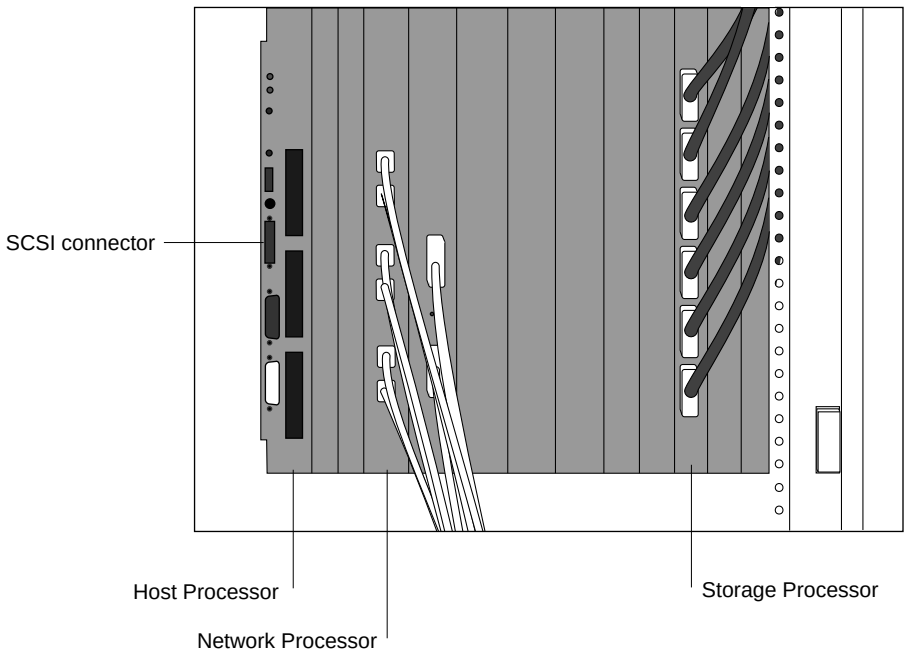


Figure 2-8. System processors

Processor Board Slot Assignments

This section describes slot assignments for each processor board. For information on processor board configurations, refer to Chapter 1.

Table 2-4 lists the slot allocations for each processor board.

Table 2-4. Processor board slot allocations

	Slot													
Processor board	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Host Processor	■	■												
Network Processor					■	■	■	■	■	■				
Storage Processor			■	■								■	■	■

- The Host Processor board is installed in slots 1 and 2.
- The fourth and fifth Storage Processor boards are installed in slots 3 and 4 (numbered SP3 and SP4 by the system software).
- Starting in slot 5, Network Processor boards are installed (up to five).
- Slot 11 is reserved for future use.
- Starting in slot 12, the first three Storage Processor boards are installed (numbered SP0, SP1, and SP2 by the system software).

Note: Slots 2 and 10 are not accessible individually. Slots 5, 6, 7, and 8 are double-width slots. Slots 9 and 10 serve as the fifth double-width slot for the NP boards.

Power Supply Configurations

This section describes the power supply configurations for redundant and nonredundant operation for the base cabinet and expansion cabinet main power supplies and the 48 volt bulk power supplies. The section briefly describes the Disk DCC requirement for each drive drawer.

In a redundant configuration, if one power supply fails, the remaining power supply keeps the NetServer operating. When this occurs, the failed power supply can be hot-plugged (replaced) while the server is running off the remaining supply. Power supplies can also be hot-plugged when your configuration requires additional power.

Note: Contact your authorized Auspex service representative for assistance with installing power supplies.

For more information on power subsystem operation, refer to Chapter 5.

Main Power Supplies

The base cabinet supports up to three main power supplies. These power supplies share the power requirements of the NetServer processor boards and seven-slot drive rack.

The NetServer is shipped with two main power supplies for nonredundant system operation. For redundant system operation, you must add a third power supply.

Bulk Power Supplies

The bulk power supplies are located below the seven-slot drive rack in the base cabinet and below the HDDA chassis in the expansion cabinet (see Figures 2-3 through 2-5).

Redundancy operation for the HDDAs is optional with bulk power supplies. Auspex ships each NetServer from the factory configured with one bulk power supply for each HDDA. When ordering additional HDDAs, you must order additional bulk power supplies.

Disk DC Converter (DCC)

Each drive drawer requires one Disk DCC converter to convert the 48-volt power (supplied by the bulk power supplies) into 5 and 12 -volt power for the disk drives in the drive drawer. Every drive drawer ships from the factory with a Disk DCC installed.

3 Installation

About This Chapter

This chapter provides the procedures for installing the NetServer components. The following sections are covered in this chapter:

- Grounding the NetServer
- Installing the Antistatic Wrist Strap
- Connecting the System Console
- Network Cable Connections
- Network Interface Numbering
- Installing Drives in the Seven-Slot Drive Rack
- Installing an HDDA Drive Drawer

Caution: Throughout the procedures in this chapter, when you are instructed to cut tie-wraps to free needed cables or components, remember to cut only red tie-wraps. Do not cut the black or white tie-wraps. The black and white tie-wraps hold bundles of cables together and keep them out of the way during system operation and drive installation.

Note: The NetServer is configured at the factory to match your order. Additional processor boards, memory, and drives are available as optional equipment. Contact your authorized Auspex service representative for processor board or memory installation.

For installation at sites with raised flooring, the base cabinet and expansion cabinet have a floor access panel that can be removed, allowing the NetServer cabling to pass through the hole in the floor of the cabinet. For assistance with removing the floor access panel, contact your authorized Auspex service representative.

Grounding the NetServer

This section provides instructions for grounding the base cabinet. You must plug in the power cable for each cabinet to create a ground path for the antistatic wrist strap.

Warning: The wiring at your site must provide for ground fault protection to prevent electric shock during installation.

Tools

- Knife
- Wire cutter
- 3/16-inch flat-head screwdriver
- 7/16-inch nut driver
- #2 Phillips screwdriver

To ground the NetServer

1. Locate the main power switch on the PDU in the base cabinet, and set it to OFF (O). Figure 3-1 shows the location of the main power switch in the base cabinet.

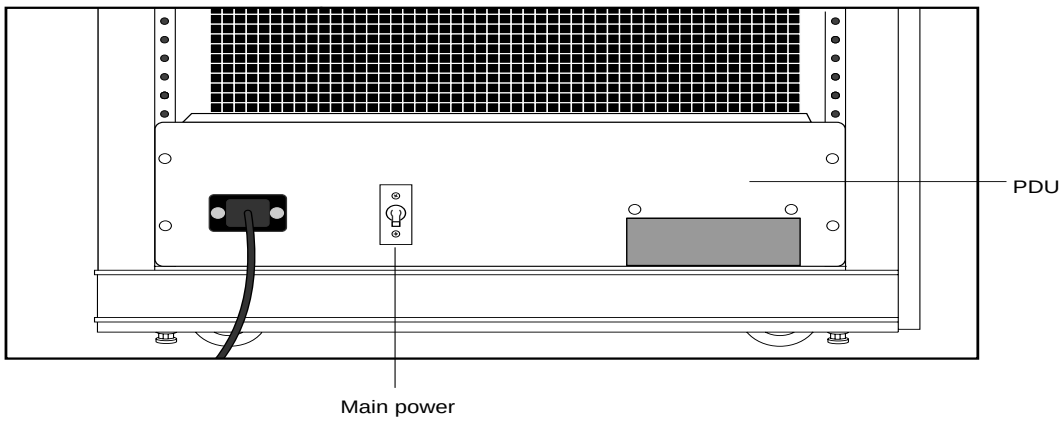


Figure 3-1. Main power switch (back view of base cabinet)

2. If you are connecting an expansion cabinet, locate the main power switch on the PDU in the expansion cabinet. Set this switch to OFF (O). Figure 3-2 shows the location of the main power switch in the expansion cabinet.

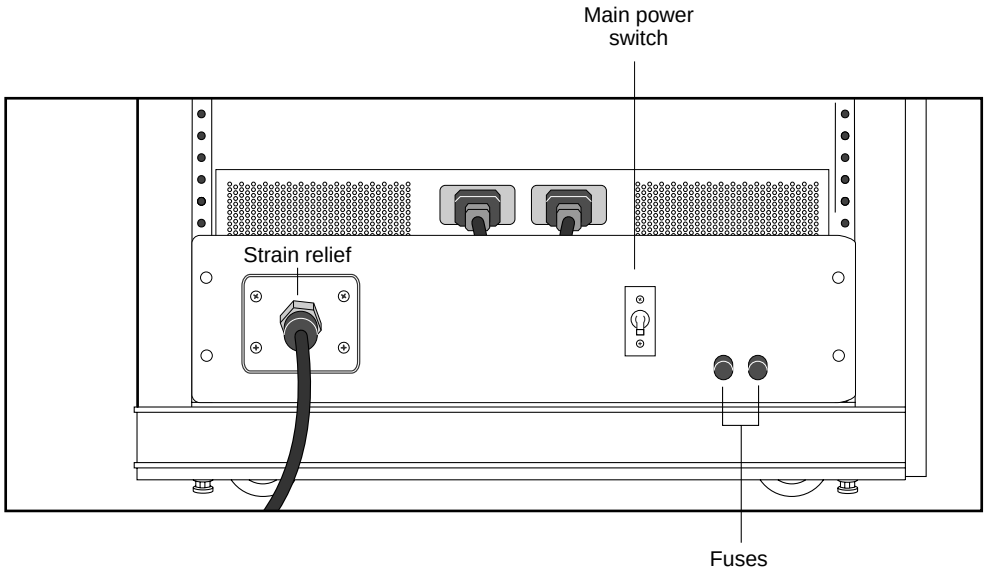


Figure 3-2. Main power switch (back view of expansion cabinet)

3. Locate the power cable for each cabinet.

   On the base cabinet, the cable is hanging on the left side of the cabinet, secured with red tie-wraps. On the expansion cabinet, the cable is coiled on top of the panel covering the power supply.

4. Cut the red tie-wraps to release the power cable, and plug the appropriate end to the back of the PDU.

5. Tighten the strain relief surrounding the plug at the PDU.

6. After ensuring the power to the system is off, route each power cable to a separate grounded outlet, and plug it in. The outlet must be on a 20-amp circuit for the base cabinet and on a 30-amp circuit for the expansion cabinet.

Caution: Do not power on the server at this time. You connected the power cable only to provide a ground path for the antistatic wrist strap. Do not power on the NetServer until instructed to do so later in this manual.

This completes the procedure for grounding the NetServer.

Installing the Antistatic Wrist Strap

This section provides procedures for installing the antistatic wrist strap. To prevent electrostatic damage to the NetServer, always wear the antistatic wrist strap when you come in contact with electrostatic-sensitive equipment.

Note: The wrist strap cannot prevent electrostatic damage to system components until the NetServer power cable is plugged into a grounded power outlet.

The base cabinet and expansion cabinets have two wrist strap jacks each, one on the left chassis frame rail inside the upper front door and one on the left chassis frame rail inside the back door.

One wrist strap is provided with each cabinet. On the base cabinet, the strap is attached to the back jack. On the expansion cabinet, the strap is attached to the front jack.

1. Cut the red tie-wraps holding the wrist strap to the chassis frame rail hook.
2. To use the wrist strap, remove the strap from the hook and slide it around your wrist, as shown in Figure 3-3.

Note: When you are not using the wrist strap, remember to hang it on the hook.

3. As you move between the front and back of the system, you can unplug the wrist strap from one jack into another.

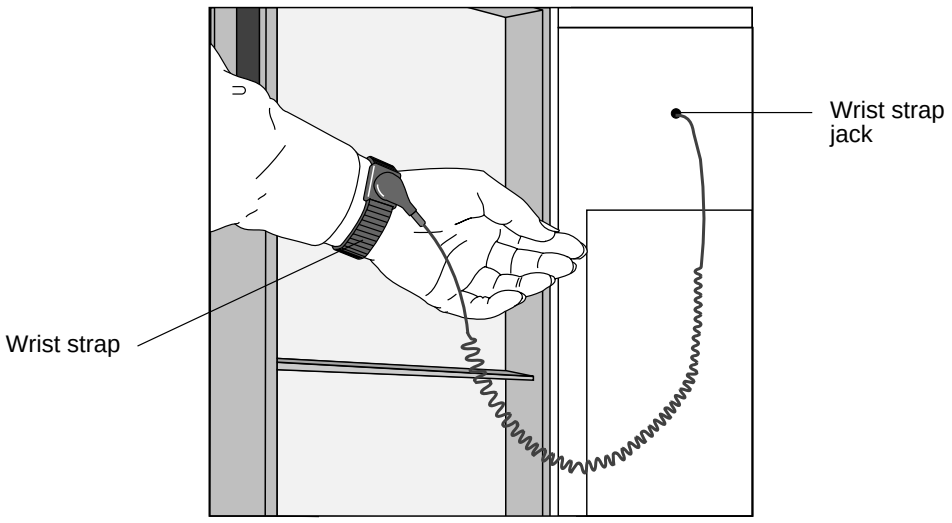


Figure 3-3. Antistatic wrist strap (back view of base cabinet)

This completes the procedure for installing the antistatic wrist strap.

Connecting the System Console

Each NetServer includes an ANSI-compatible system console. This section explains how to connect the system console to the NetServer. If you wish to use another type of console, contact Auspex Technical Support for compatibility information.

Table 3-1 lists the setup parameters for configuring the system console with the NetServer. These parameters are preconfigured for system consoles purchased from Auspex.

Table 3-1. Setup parameters for system consoles

Parameter	Value
Handshake	XON/XOFF
Mode	Full-duplex
Data bits	8
Stop bit	1
Parity bit	None
Modem port	9600 bps
Compatibility	ANSI

To connect the system console to the server

1. Remove the console and its components from the packing box.
2. Connect the keyboard and power cable to the console, as described in the console's user manual.

Caution: Do not power on the console at this time.

3. Remove the console cable from its packing box.
4. Put on the antistatic wrist strap, and wear it throughout the procedure.
5. Route one end of the console cable through the opening in the PDU at the back of the cabinet, as shown in Figure 3-4.

Note: In raised-floor environments, the cable can be routed through the floor panel of the NetServer. Contact your authorized Auspex service representative for assistance.

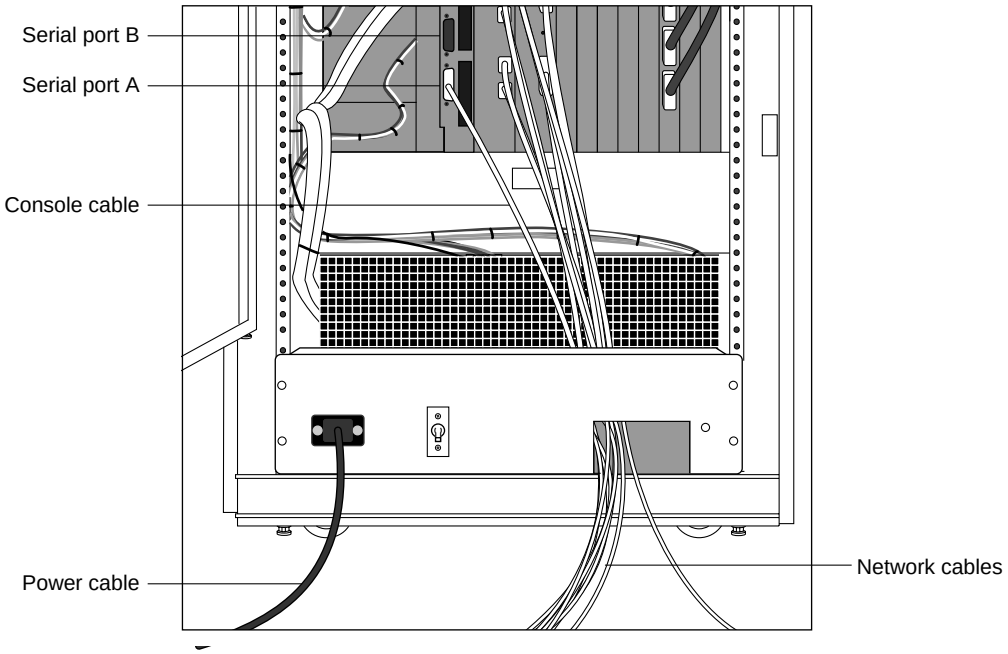


Figure 3-4. Routing cables to the NetServer

6. Connect the console cable to **Serial Port A** on the HP.
7. Replace the wrist strap on the back door of the base cabinet.
8. Connect the remaining end of the cable to **Comm 1** on the back of the console.
9. Make sure the console power cable is properly connected to the console, and plug it into a grounded power outlet.

Caution: Do not use the power outlets on the back of the PDU to power peripheral devices such as the console unless the console can accept the same voltage as the wall outlet. If there is a mismatch in voltage, you can damage the peripheral device.

10. Power on the system console.

This completes the procedure for connecting the system console to the NetServer.

Note: If you did not purchase your system console from Auspex, configure the console as described in Appendix C.

Network Cable Connections

This section is provided as a reference to show the network cable connections to ATM, Ethernet, and FDDI ports on NP boards.

Note: The FDDI-SAS port for a fiber connection is a single-attach station of "Type S." Connect the FDDI-SAS to a "Type M" FDDI concentrator port only.

The FDDI-DAS ports are a dual-attach station. Connect directly to the primary and secondary FDDI rings or to "Type M" ports on two concentrators in a dual-homed configuration.

Figures 3-5 through 3-13 illustrate connections to Ethernet, FDDI and ATM ports on NP boards.

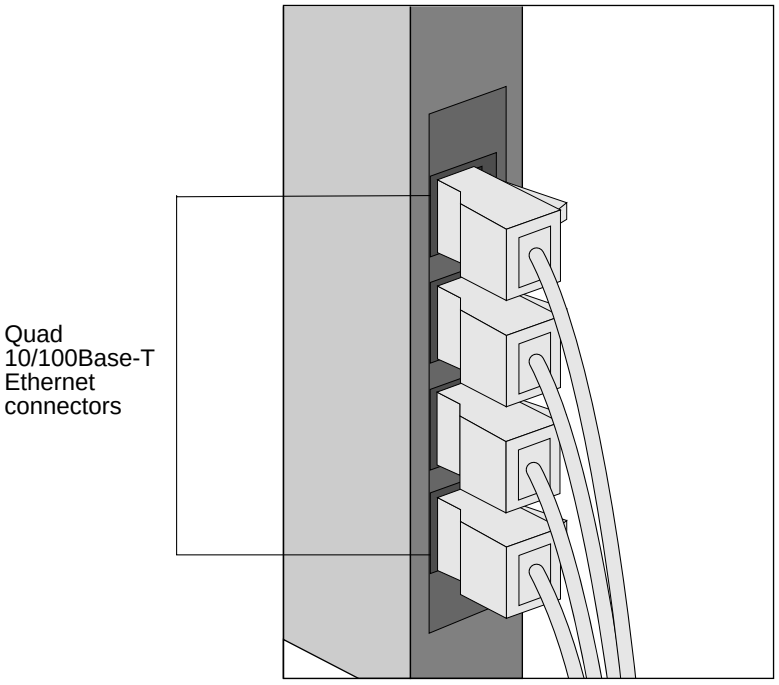


Figure 3-5. Connection to Quad 10/100Base-T Ethernet ports

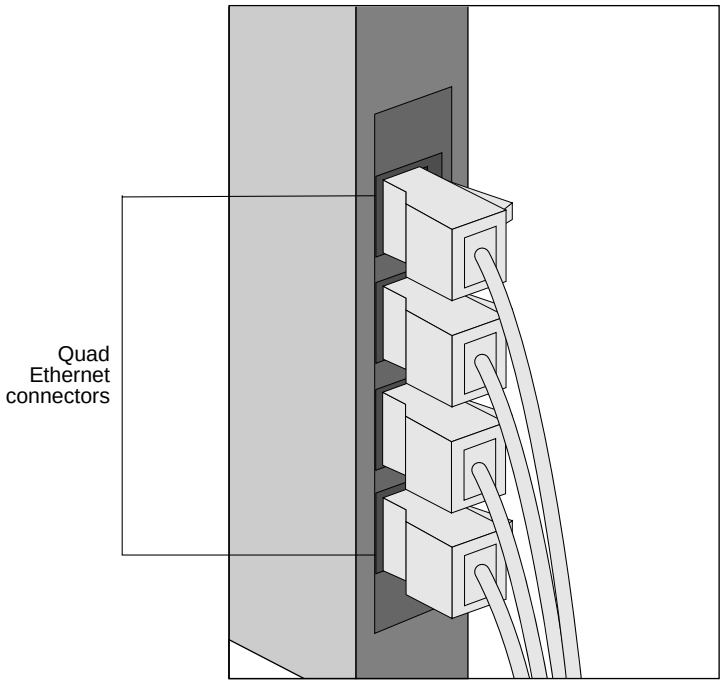


Figure 3-6. Connection to Quad Ethernet ports

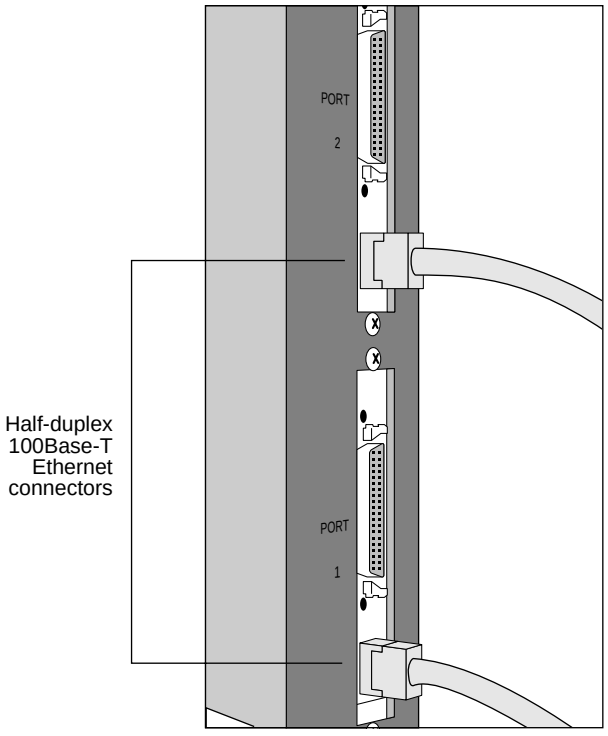


Figure 3-7. Connection to half-duplex 100Base-T Ethernet ports

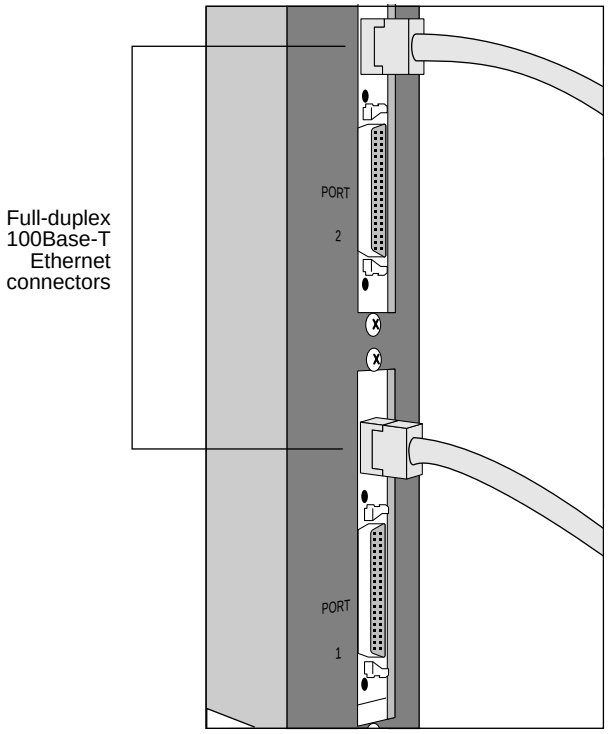


Figure 3-8. Connection to full-duplex 100Base-T Ethernet ports

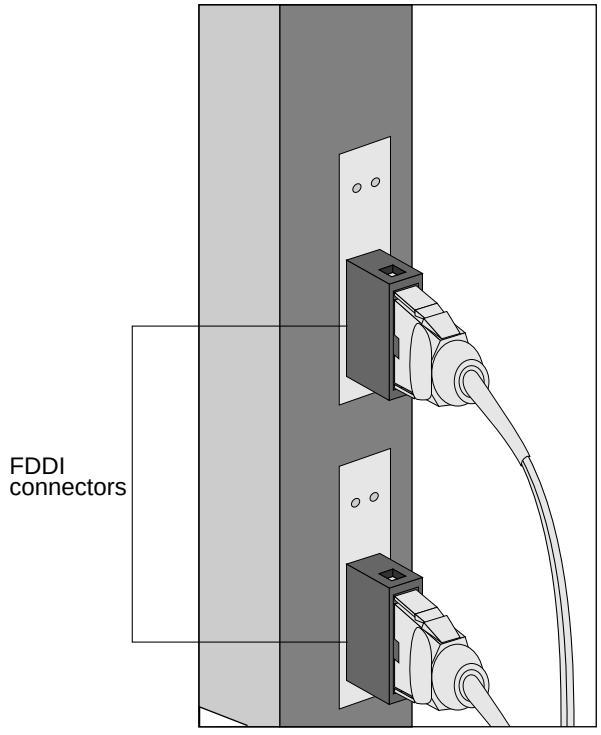


Figure 3-9. Connection to FDDI (fiber) ports

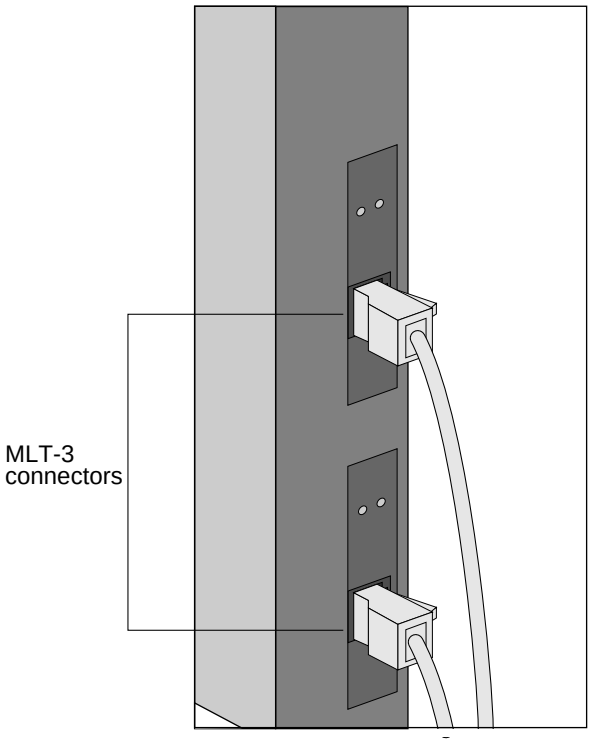


Figure 3-10. Connection to FDDI (MLT-3) ports

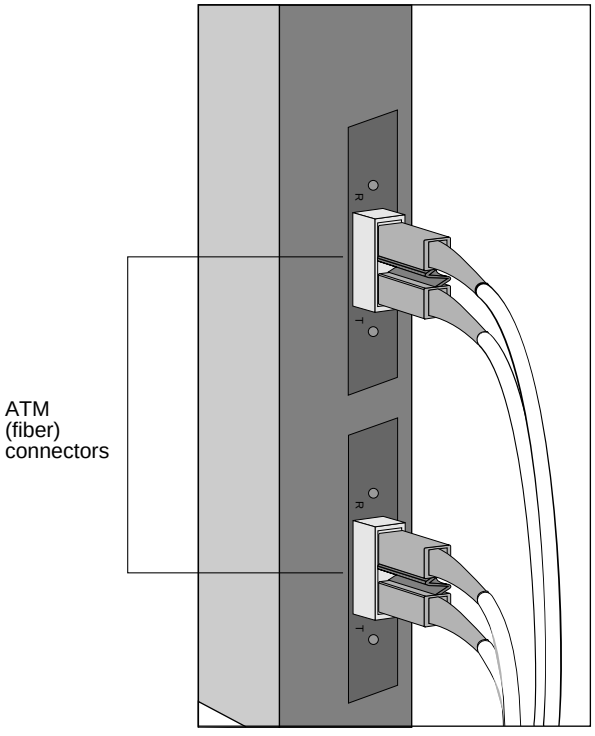


Figure 3-11. Connection to ATM (fiber) ports

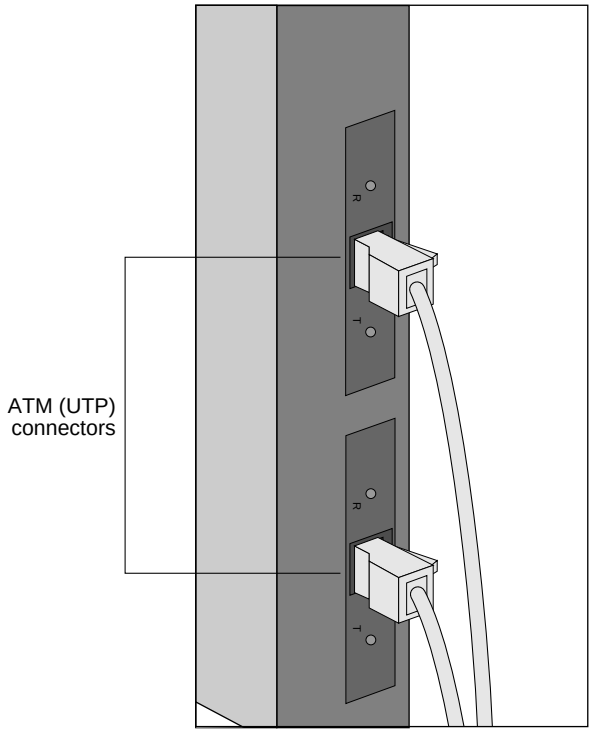


Figure 3-12. Connection to ATM (UTP) ports

Network Interface Numbering

Network interface numbering is used to configure the system software so it identifies each installed interface. The numbering scheme for each supported network interface is described as follows.

Quad 10/100Base-T Ethernet	Quad 10/100Base-T Ethernet interfaces are numbered ahme0 to ahme*n*, where 0 is the lower Ethernet port closest to the HP, and *n* is the upper Ethernet port farthest from the HP.
Quad Ethernet	Quad Ethernet interfaces are numbered aqe0 to aqe*n*, where 0 is the lower Ethernet port closest to the HP, and *n* is the upper Ethernet port farthest from the HP.
Half-duplex 100Base-T Ethernet	Half-duplex 100Base-T interfaces are numbered afe0 to afe*n*, where 0 is the lower Ethernet port closest to the HP, and *n* is the upper Ethernet port farthest from the HP.
Full-duplex 100Base-T Ethernet	Full-duplex 100Base-T interfaces are numbered ahme0 to ahme*n*, where 0 is the lower Ethernet port closest to the HP, and *n* is the upper Ethernet port farthest from the HP.
FDDI	FDDI interfaces are numbered afddi0 to afddi*n*, where 0 is the lower FDDI port closest to the HP, and *n* is the upper FDDI port farthest from the HP.

Note: In DAS network configurations, only one port is assigned an interface number although two ports exist on the FDDI-DAS SBus card.

ATM	Each ATM port supports three types of interfaces: 1 FORE IP primary interface, 4 Classical IP virtual interfaces, and 16 LANE Client (LEC) interfaces. Refer to Table 3-2 for an example of the network numbering for these interfaces.

Table 3-2 shows an example of ATM network interface numbering on a NetServer with two NP boards (NP0, NP1), each having two ATM SBus cards (0, 1 and 2, 3).

Table 3-2. ATM network interface numbering

NP board no.	ATM adapter no.	FORE IP primary interfaces	Classical IP virtual interfaces	LANE Client interfaces
0	0	afa0	aqa0, aqa1, aqa2, aqa3	ael0 – ael15
0	1	afa1	aqa4, aqa5, aqa6, aqa7	ael16 – ael31
1	2	afa2	aqa8, aqa9, aqa10, aqa11	ael32 – ael47
1	3	afa3	aqa12, aqa13, aqa14, aqa15	ael48 – ael63

Ethernet Addressing

Auspex assigns unique network addresses (starting with 00:00:3c) to the Ethernet ports to identify each interface. The interfaces are numbered from bottom to top.

Table 3-3 shows an example of the Quad 10/100Base-T Ethernet addressing shown in Figure 3-13 on page 3-14.

Table 3-3. Quad 10/100Base-T Ethernet addressing

Interface no.	Network address
ahme11	00:00:3c:99:99:0B
ahme10	00:00:3c:99:99:0A
ahme9	00:00:3c:99:99:09
ahme8	00:00:3c:99:99:08
ahme7	00:00:3c:99:98:07
ahme6	00:00:3c:99:98:06
ahme5	00:00:3c:99:98:05
ahme4	00:00:3c:99:98:04
ahme3	00:00:3c:99:97:03
ahme2	00:00:3c:99:97:02
ahme1	00:00:3c:99:97:01
ahme0	00:00:3c:99:97:00*

* Example of the network address that appears on the NP board label.

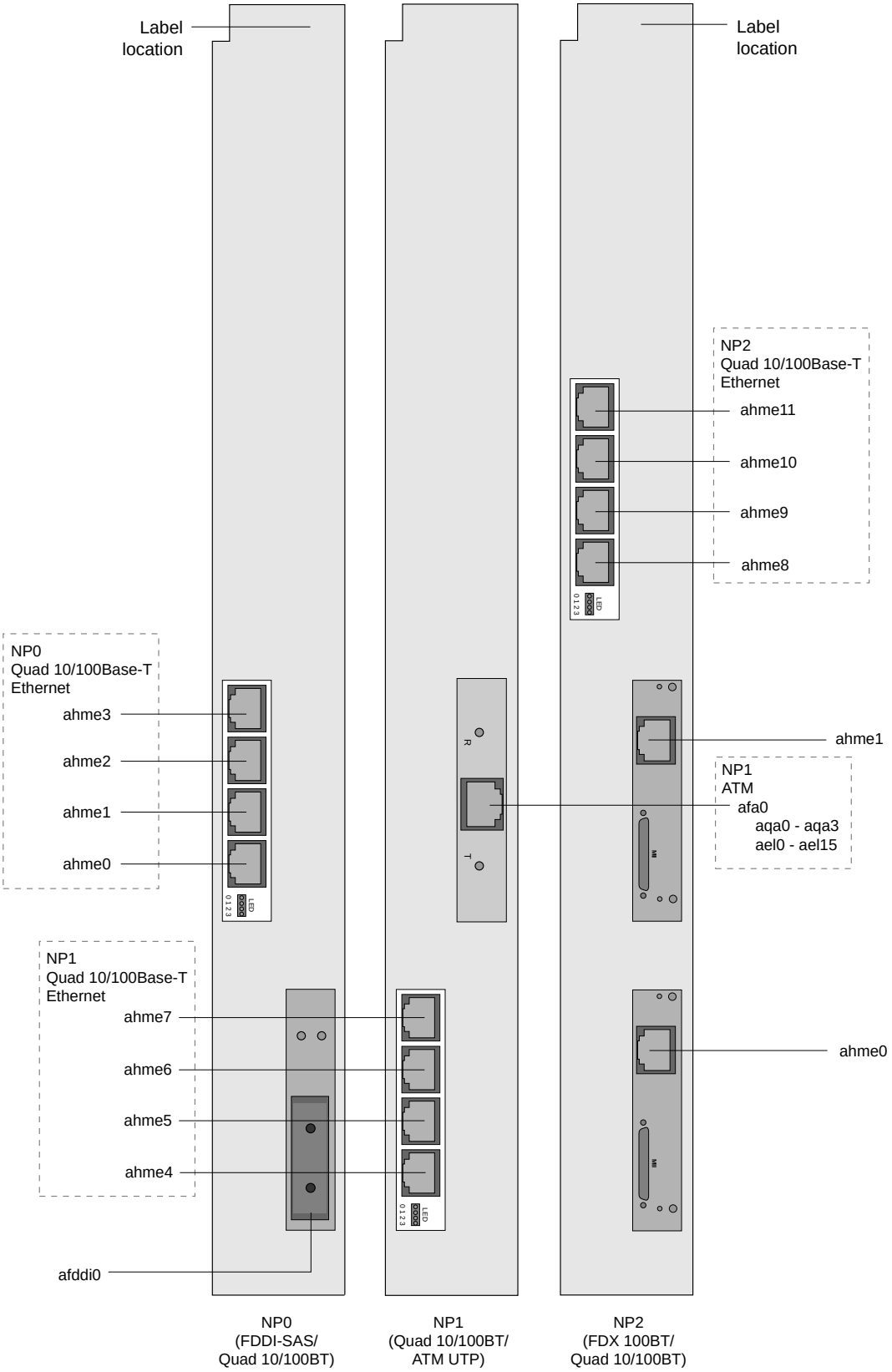
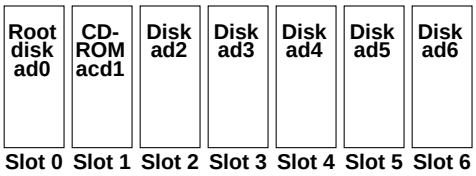


Figure 3-13. Example network interface numbering on the NP boards

Installing Drives in the Seven-Slot Drive Rack

This section provides the procedures for installing drives in the seven-slot drive rack. For instructions on removing drives from the seven-slot drive rack, refer to Appendix A.

Drive labels are shipped with the drives for recording drive numbers, as recognized by the system software. Put extra labels in a safe place; you will need them as you expand disk space. The drives and drive slots are numbered as follows:



Note: The procedures in this section assume the NetServer is powered off.

To install a drive in the seven-slot drive rack

1. Put on the antistatic wrist strap.
2. Remove the drive from its antistatic wrapping. The drive has a label located on the front of the drive carrier.

   The first drive you install is the root drive which contains the system software. This drive installs in slot 0 in the drive rack. The next drive is the CD-ROM, which installs in slot 1, then any remaining drives.
3. Holding the drive by the handle and cradling it with your other hand, gently slide the drive into the drive slot until the small latch button on top of the drive carrier snaps into place. Be sure to install the root drive into slot 0. See Figure 3-14.

Caution: Do not slam drives into the drive slots. Slamming the drives into the drive slots can cause damage to the drives and connectors.

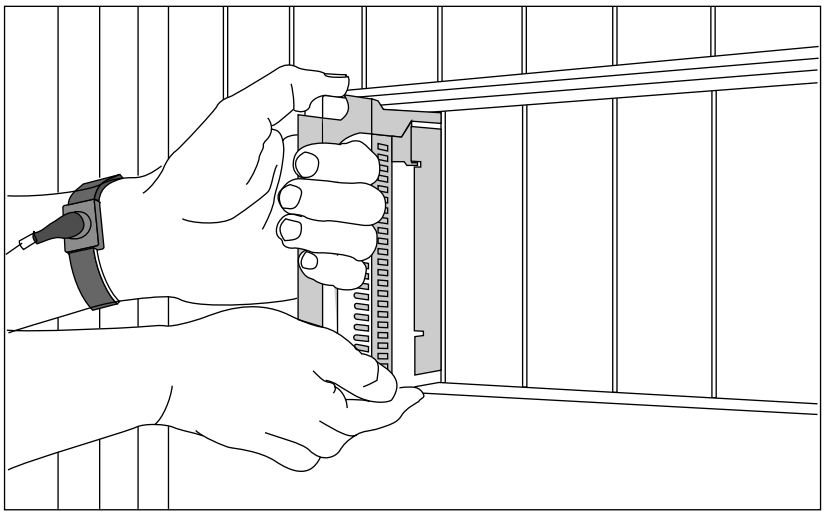


Figure 3-14. Installing a drive in the seven-slot drive rack

Drives install in one direction only. If the drive does not slide into the drive slot easily, or the latch does not click into place, remove the drive, and try again. Make sure the drive is in the correct position, with the latch button at the top of the handle.

4. Repeat steps 2 and 3 to add additional drives.

This completes the procedure for installing a drive in the seven-slot drive rack.

Installing an HDDA Drive Drawer

This section describes how to install an HDDA drive drawer in the base or expansion cabinet. Drives are pre-installed in the drive drawers at the factory. To install additional loose drives in the drive drawer, refer to Appendix A.

The HDDA chassis, which hold the drive drawers, are pre-installed at the factory. The base cabinet supports up to two HDDA chassis; the expansion cabinet supports up to five HDDA chassis.

Note: This procedure assumes you understand the drive drawer and HDDA numbering as described in Appendix A. Refer to Appendix A for more information.

Tools

- Antistatic wrist strap
- 3/32 Allen wrench

Note: The procedures in this section assume the NetServer is powered off.

To install an HDDA drive drawer

1. Put on the antistatic wrist strap.
2. Identify the HDDA chassis where you will install the drive drawer.

   The drive drawers are installed from left to right in the HDDA chassis, from the bottom HDDA chassis to the top HDDA chassis.
3. Locate the drive drawer handle, and insert it into the groove at the top of the drive drawer (see Figure 3-15).

Note: Only one drawer handle is required for each HDDA rack. Once installed, it slides from drawer to drawer within the groove of the faceplate to allow you to open any drawer in the rack.

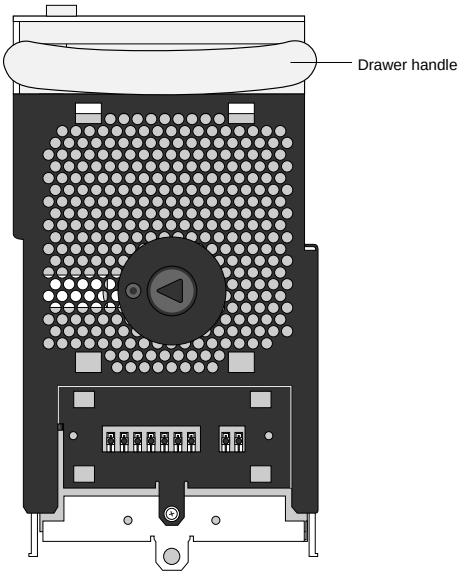


Figure 3-15. Drive drawer front panel

4. Holding the drive drawer with both hands, align the drive drawer with the side rails in the HDDA chassis, and gently slide the drive drawer halfway into the drawer slot.

Caution: Do not force the drive drawers into the slots; doing so can damage the unit.

5. While holding the handle at a 45-degree angle, slide the drawer the rest of the way into the slot until is about 3/4-inch from the HDDA chassis (see Figure 3-16).

Note: Be sure that the drawer faceplate is pulled down far enough to allow the cam lever at the bottom of the faceplate to clear the chassis. Once in position, the cam lever provides the cam action that firmly seats the drawer into the chassis once it's closed.

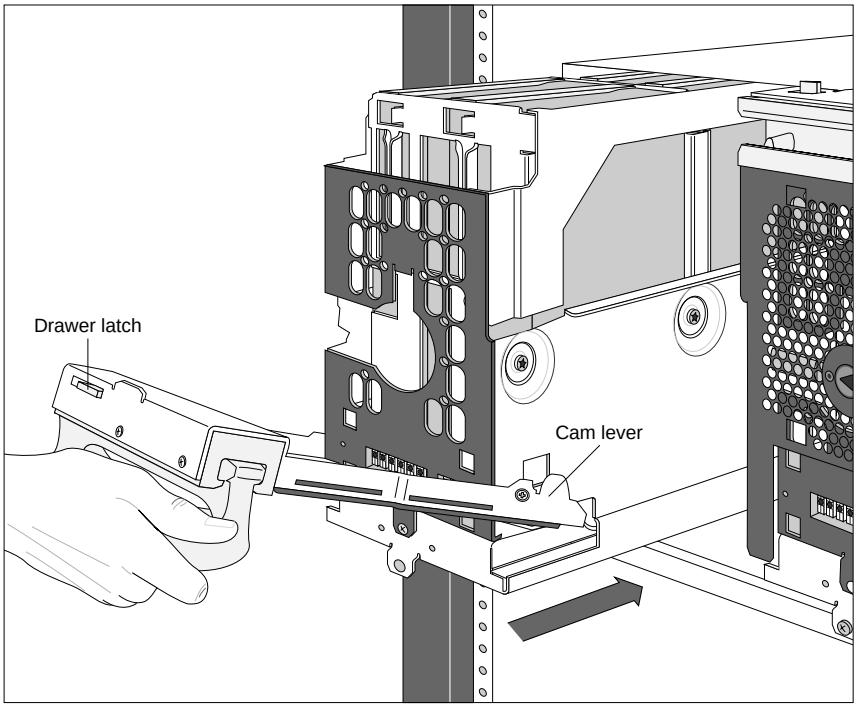


Figure 3-16. Installing a drive drawer

Caution: Do not force the drive drawers into the drive drawer slots; doing so will damage the unit.

6. Push the drawer handle up so that the cam lever engages the cam slots in the HDDA chassis. See Figure 3-17.

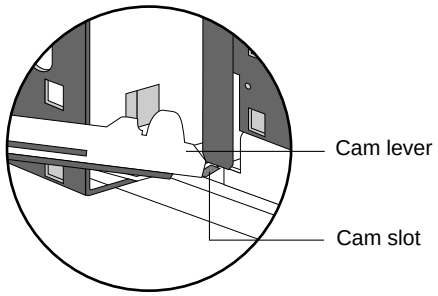


Figure 3-17. Cam lever engaging in cam slot

7. Once the cam lever is engaged in the cam slots, seat the drive drawer firmly into the drawer slot by pressing the handle closed. The caming action of closing the handle seats the drive drawer properly. See Figure 3-18.

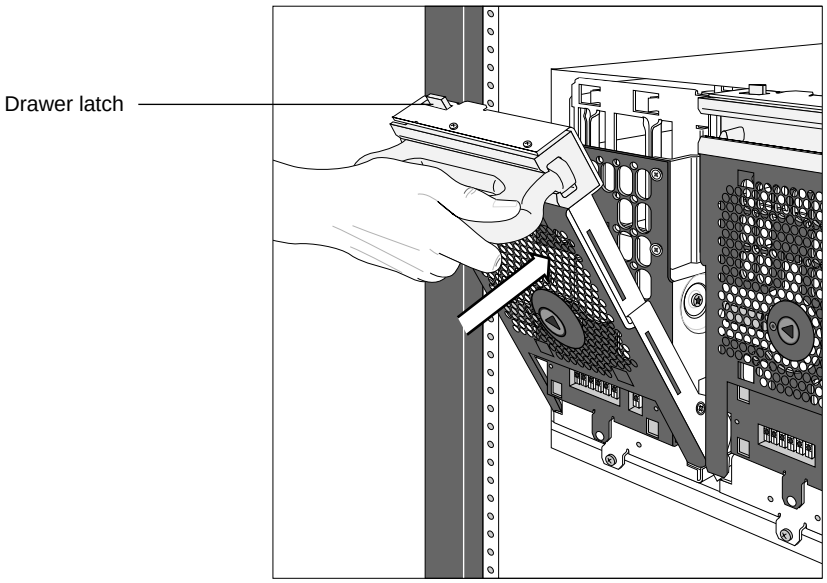


Figure 3-18. Latching the drive drawer

The drawer latch at the top left corner of the drive drawer will click into position when the drawer is properly seated.

Caution: Do not force the drive drawers into the slots; doing so will damage the unit. If the drawer is not seating properly, move the handle to release the drawer latch, pull the drawer out, and try again.

8. Secure the drive drawer to the HDDA chassis by removing the retaining screw from the upper hole position to the lower hole position.

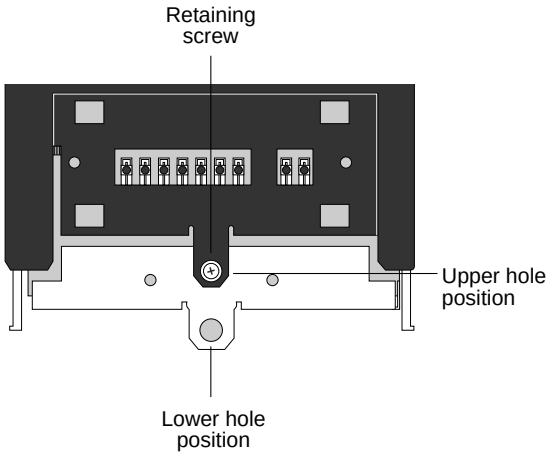


Figure 3-19. Location of retaining screw (drawer front panel)

9. Lock the drive drawer into position by inserting the drawer key (tie-wrapped along with the base cabinet door keys) into the drive drawer lock and turn it clockwise, as shown in Figure 3-20.

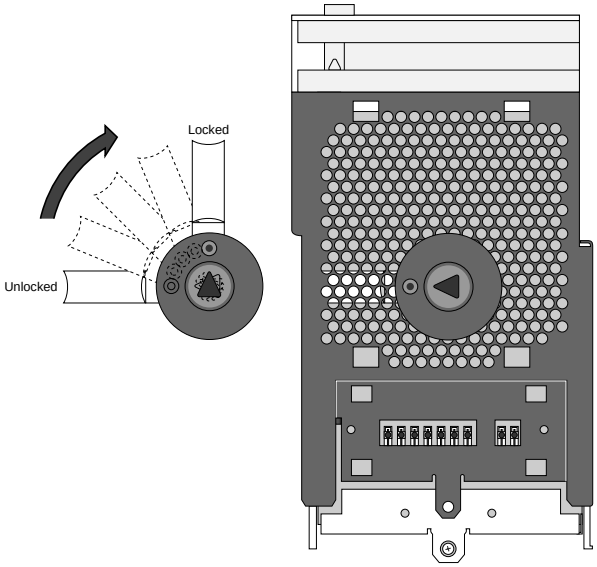


Figure 3-20. Locking the drive drawer

10. Repeat steps 4 through 9 to install additional drive drawers.

This completes the procedure for installing an HDDA drive drawer.

To add additional drives to an HDDA drive drawer, refer to Appendix A.

4 Power On and Shut Down

About This Chapter

This chapter describes how to power on and shut down the NetServer.

The following sections are covered in this chapter:

- Powering On the NetServer
- Power-On Self Test and Boot Sequence
- Shutting Down the NetServer

Powering On the NetServer

Caution: Never cover the cooling vents on top of the NetServer. Covering the vents causes the NetServer to overheat and damages the server.

1. Verify the diagnostic switch on the HP is set to NORM.

   The diagnostic switch is the lower of the two switches located on the front panel of the HP. Push this switch down to set it to NORM (see Figure 2-7 on page 2-14).

2. Make sure the main power switch on the base and each expansion cabinet's PDU is set to OFF (O) (see Figure 3-1 on page 3-2).

   Caution: Use the main power switch on the PDU only.

   In the NetServer, the switch located at the top of each power supply located at the front of the cabinet should always be turned to ON (—).

3. Close the doors on the base and expansion cabinets.
4. Power up the console terminal.
5. Power on each expansion cabinet by setting its power switch to ON (**I**).
6. Power on each tape storage device, if present, by setting its power switch to ON (**I**).
7. Power on the base cabinet by setting its main power switch to ON (**I**).

Recommendation: Auspex recommends that you power on the expansion cabinets before you power on the base cabinet. If you power on the base cabinet first, power on the expansion cabinets within 10–15 seconds after powering on the base cabinet.

After powering on the NetServer, it runs a series of self tests and displays the results of these tests on the console screen. For a list of the power-on self tests and messages, refer to section "Power-On Self Test and Boot Sequence" on page 4-3.

This concludes the procedure for powering on the NetServer.

To monitor system components after power on, refer to Chapter 5, "Preventative Maintenance."

Power-On Self Test and Boot Sequence

The following is a sample boot message file. System messages can vary depending on the individual system configurations.

```
EEPROM boot device...ad(0,0,0)
sp - status 70  71  f0
skipping SP loopback test
passed SP inquiry cmd to the boot device
passed SP test unit ready cmd to the boot device
sp found in slot = 12
Boot device: /mvic/vme/asp@6d,1180/ad@0,0:0 File and args:
0x4000
bootblock loaded
sp - status f0
skipping SP loopback test
passed SP inquiry cmd to the boot device
passed SP test unit ready cmd to the boot device
sp - status f0
skipping SP loopback test
passed SP inquiry cmd to the boot device
passed SP test unit ready cmd to the boot device
root on ad0a fstype 4.2
Boot: vmunix
Size: 1212416+250744+557648 bytes
m16u_npages_dvma = 588
m16u_net_interfaces = 30
VAC ENABLED in COPYBACK mode
Auspex 1.9.2/SunOS 4.1.4 (AUSPEX1.OPTIMIZED)
#1: Tue Oct 28 02:34:53 PST 1997
Copyright 1989-1997 Auspex Systems, Inc.
Copyright 1983-1994 Sun Microsystems, Inc.
cpu = ASPX,Auspex SPARC Processor
mod0 = Ross,RT625 (mid = 2)
mem = 262144K (0x10000000)
avail mem = 248889344
dma0 at  SBus slot 1 0x400000
esp0 at  SBus slot 1 0x800000 pri 3
123.45.67.890 ross20-3
SP0 at Auspex VME slot 12
SP1 at Auspex VME slot 14
SP2 at Auspex VME slot 3
IOP0 at Auspex VME slot 7 VME address 0x10000000 memory 128 MB
IOP1 at Auspex VME slot 8 VME address 0x20000000 memory 128 MB
ad0: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad2: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad3: <SEAGATE ST15150N        4611; 4094 MBs>
ad4: <SEAGATE ST15150N        4611; 4094 MBs>
ad5: <SEAGATE ST15150N        4611; 4094 MBs>
ad8: <SEAGATE ST19171W        0023; 8668 MBs>
```

```
ad9: <SEAGATE ST19171W        0023; 8668 MBs>
ad10: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad11: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad12: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad13: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad14: <SEAGATE ST19171W        0023; 8668 MBs>
ad15: <SEAGATE ST19171W        0023; 8668 MBs>
ad16: <SEAGATE ST19171W        0023; 8668 MBs>
ad17: <SEAGATE ST19171W        0023; 8668 MBs>
ad18: <SEAGATE ST19171W        0023; 8668 MBs>
ad19: <SEAGATE ST19171W        0023; 8668 MBs>
ad20: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad21: <SEAGATE ST19171W        0023; 8668 MBs>
ad22: <SEAGATE ST19171W        0023; 8668 MBs>
ad23: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad24: <SEAGATE ST19171W        0023; 8668 MBs>
ad25: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad26: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad27: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad28: <SEAGATE ST19171W        0023; 8668 MBs>
ad29: <SEAGATE ST19171W        0023; 8668 MBs>
ad30: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad31: <SEAGATE ST19171W        0023; 8668 MBs>
ad32: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad33: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad34: <SEAGATE ST19171W        0023; 8668 MBs>
qec unit 0 at iop0 SBus slot 0
be unit 0 at iop0 SBus slot 0
qec unit 1 at iop0 SBus slot 1
be unit 0 at iop0 SBus slot 0
qec unit 2 at iop1 SBus slot 0
qe unit 0 at iop1 SBus slot 0
qe unit 0 at iop1 SBus slot 1
qe unit 0 at iop1 SBus slot 2
qe unit 0 at iop1 SBus slot 3
CRES,cddi unit 0 at iop1 SBus slot 2
root on ad0a fstype 4.2
swap on ad0b fstype spec size 614400K
dump on ad0b fstype spec size 614388K
checking root and /usr filesystems
/dev/rad0a: 10289 files, 23021 used, 72530 free
/dev/rad0a: (50 frags, 9060 blocks, 0.1% fragmentation)
/dev/rad0g: is stable.

rc.auspex: Starting System Level 1 Diagnostics.
axd: Enter ^C to display axd selection menu.
rc.auspex: Running ax_startup (download boards and start daemons).
ax_startup: Starting execution.
ax_startup: Opening /dev/ipc.
ax_startup: Preparing to download M16 in the boards.
```

```
ax_startup: Starting k_init.
ax_startup: Starting M16 daemon AX_KPROC on the HP.
ax_startup: Starting M16 daemon AX_SMON on the HP.
ax_startup: Checking for M16 up in all the boards.
ax_startup: Checking HP0 in slot 1 for reset.
ax_startup: HP0 in slot 1 does not need to be reset.
ax_startup: Checking SP2 in slot 3 for reset.
ax_startup: SP2 in slot 3 does not need to be reset.
ax_startup: Checking IOP0 in slot 7 for reset.
ax_startup: IOP0 in slot 7 does not need to be reset.
ax_startup: Checking IOP1 in slot 8 for reset.
ax_startup: IOP1 in slot 8 does not need to be reset.
ax_startup: Checking SP0 in slot 12 for reset.
ax_startup: SP0 in slot 12 does not need to be reset.
ax_startup: Checking SP1 in slot 14 for reset.
ax_startup: SP1 in slot 14 does not need to be reset.
ax_startup: Downloading M16 in IOP3_NP:0 slot 7.
ax_startup: Downloading M16 complete in IOP3_NP:0 slot 7.
ax_startup: Downloading M16 in IOP3_NP:1 slot 8.
ax_startup: Downloading M16 complete in IOP3_NP:1 slot 8.
ax_startup: Downloading M16 in IOP3_FP:0 slot 7.
ax_startup: Downloading M16 complete in IOP3_FP:0 slot 7.
ax_startup: Downloading M16 in IOP3_FP:1 slot 8.
ax_startup: Downloading M16 complete in IOP3_FP:1 slot 8.
ax_startup: Waiting for IOP3_NP:0 slot 7 to initialize.
ax_startup: IOP3_NP:0 slot 7 is initialized.
ax_startup: Waiting for IOP3_NP:1 slot 8 to initialize.
ax_startup: IOP3_NP:1 slot 8 is initialized.
ax_startup: Waiting for IOP3_FP:0 slot 7 to initialize.
ax_startup: IOP3_FP:0 slot 7 is initialized.
ax_startup: Waiting for IOP3_FP:1 slot 8 to initialize.
ax_startup: IOP3_FP:1 slot 8 is initialized.
ax_startup: Disable board probing.
ax_startup: Downloading M16 in the SPs.
ax_startup: Downloading M16 in SP5:2 slot 3.
ax_startup: Downloading M16 complete in SP5:2 slot 3.
ax_startup: Disable board probing.
ax_startup: Downloading M16 in SP5:0 slot 12.
ax_startup: Downloading M16 complete in SP5:0 slot 12.
ax_startup: Disable board probing.
ax_startup: Downloading M16 in SP5:1 slot 14.
ax_startup: Downloading M16 complete in SP5:1 slot 14.
ax_startup: Disable board probing.
ax_startup: Enable board probing.
ax_startup: Inter board probing successful, set default timeouts.
ax_startup: M16 is up in all the boards.
ax_startup: Complete, boards are operational.
running ax_chkdrive...
ax_write_cache: SP0 initializing write cache.
ax_write_cache: SP2 initializing write cache.
```

```
ax_write_cache: SP0 enabling write cache.
ax_write_cache: SP0 write cache is 'ON'.
ax_write_cache: SP2 enabling write cache.
ax_write_cache: SP2 write cache is 'ON'.
ax_enable: AXdguard enabled
ax_enable: AXftp enabled
ax_enable: AXbackup enabled
ax_enable: AXdrvgrd enabled
rc.auspex: Running from rc.boot (start virtual partitions).
checking other filesystems
/dev/rvp0: is clean.
/dev/rad0f: is stable.
/dev/rad3c: is clean.
/dev/rvp1: is clean.
/dev/rad0d: is clean.
/dev/rad0e: is clean.
/dev/rvp2: is clean.
/dev/rad0h: is clean.
/dev/rvp3: is clean.
/dev/rvp4: is clean.
/dev/rvp5: is clean.
/dev/rvp6: is clean.
/dev/rvp7: is clean.
Initializing IOP-based SBA-200's...
Trying to Download Firmware....Nov 11 18:23:44 IOP1/NP1 (CPU A):
afddi0 ring up

ifconfig: "afddi0" MTU set to 4352, off-net MTU set to 4352
Nov 11 18:23:51 IOP1/NP1 (CPU A): afddi0 ring up

ifconfig: ioctl (SIOCGIFFLAGS): no such interface
Automatic reboot in progress...
Tue Nov 11 18:23:56 PST 1997
rc: mounting 4.2 and lfs file systems.
checking quotas: done.
rc.auspex: Running from rc (start more auspex daemons).
starting rpc port mapper.
starting RPC key server.
starting Auspex key daemon.
network interface configuration:
afe0: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 123.45.678.000 netmask ffffff00 broadcast 123.45.678.0
        Speed: 100 Mb/s HalfDuplex Mode
        ether 0:0:3c:3:7a:40
afe1: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 123.45.678.901 netmask ffffff00 broadcast 123.45.678.0
        Speed: 100 Mb/s HalfDuplex Mode
        ether 0:0:3c:3:0a:41
aqe0: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 10.0.0.131 netmask ffffff00 broadcast 10.0.0.0
```

```
        ether 0:0:3c:4:0a:3
aqe1: flags=42<BROADCAST,RUNNING>
        ether 0:0:3c:4:0a:2
aqe2: flags=42<BROADCAST,RUNNING>
        ether 0:0:3c:4:0a:1
aqe3: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 123.45.678.1 netmask ffffff00 broadcast 123.45.678.0
        ether 0:0:3c:4:0a:0
afddi0: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 123.45.678.901 netmask ffffff00 broadcast 123.45.678.0
        ether 0:40:x:40:ex:2x
lo0: flags=49<UP,LOOPBACK,RUNNING>
        inet 123.0.0.1 netmask ff000000

add net default: gateway server
running routing daemon in quiet mode.
starting additional services: biod.
starting system logger
starting local daemons: auditd sendmail xntpdchecking for crash
dump...

starting ServerGuard daemons:
ax_ftnfsd ax_ftmond ax_ftexecd ax_ftstatd ax_ftfaild ax_ftddd
ax_lfsd
exportfs -av
exported /usr/openwin
exported /home
exported ServerGuard filesystem /disks/sg/vp0
exported ServerGuard filesystem /disks/sg/vp1
exported ServerGuard filesystem /disks/sg/vp2
exported ServerGuard filesystem /disks/sg/vp3
exported ServerGuard filesystem /disks/sg/vp4
exported ServerGuard filesystem /disks/sg/vp5
exported ServerGuard filesystem /disks/sg/vp6
exported ServerGuard filesystem /disks/sg/vp7
starting NFS daemons: nfsd ax_nfsd -x tcp mountd
starting ServerGuard resynchronization daemon: ax_ftsyncd
mount -vat nfs
Nov 11 18:24:29 server syslog: ax_enable: AXdrvgrd licensed
Nov 11 18:24:29 server syslog: ax_enable: AXsrvgrd licensed
Nov 11 18:24:29 server syslog: ax_enable: AXbackup licensed
Nov 11 18:24:29 server syslog: ax_enable: AX100bt licensed
Nov 11 18:24:29 server syslog: ax_enable: AXftp licensed
Nov 11 18:24:30 server syslog: ax_enable: AXdguard licensed
rarpd: interface-pid in /tmp/rarplog
rarpd bootparamd statd lockd.
link-editor directory cache
ax_isolated
checking for crash dump...
preserving editor files
```

```
clearing /tmp
standard daemons: update cron uucp.
starting network daemons: inetd printer xdm.

Tue Nov 11 18:24:35 PST 1997

login:
```

Shutting Down the NetServer

This section describes how to shut down the NetServer.

To shut down the NetServer

1. At the root prompt, type the following command to halt the server's operation:

   ```
   # shutdown -lh +5 "system shutdown in +5 minutes"
   ```

   where **l** sends the warning message to users who are logged in, **h** halts the HP and causes the server to enter monitor mode, **+5** is the time in minutes before the NetServer operating system comes to a halt, and the text string informs connected clients about the shutdown.

   Server clients are warned that the system is about to shut down and given time to exit their applications. Other users are prevented from logging in. If you want to halt the system operation immediately, do not specify a time in the **shutdown** command. After the operating system comes to a halt, the monitor prompt appears on the console terminal screen:

   ```
   HP>
   ```

2. Power off the server and base cabinet by setting the main power switches to OFF (O) (see Figure 3-1 on page 3-2).

This completes the procedure for the shutting down the NetServer.

5 Preventive Maintenance

About This Chapter

This chapter provides preventive maintenance guidelines and procedures for the NetServer.

The following sections are covered in this chapter:

- Power Subsystem Operation
- HDDA Drive Drawer LEDs
- Cleaning the NetServer Air Filter
- Fan Trays and Fan Tray LEDs
- Processor Board LEDs

Power Subsystem Operation

This section describes the NetServer PDUs and power supplies.

Warning: Do not attempt to replace fuses, service PDUs, or any other power subsystems in the NetServer. Contact your authorized Auspex service representative with any power supply service requirements.

The PDU directs power from the wall outlet to the power supplies. The NetServer has two different PDUs, one for the base cabinet and one for the expansion cabinet. The main power switch for the NetServer base or expansion cabinets is on the PDU.

Caution: To prevent system damage or data corruption, use only the main power switch to power down the server.

Base Cabinet PDU

The base cabinet PDU directs power to the main power supplies and bulk power supplies. It has a power switch and convenience outlets. Auspex does not recommend using the convenience outlets. The PDU has two line cables: one feeding the main supplies and one feeding the bulk power supplies.

Caution: Always turn off power to the base cabinet using only the main power switch on the PDU.

Expansion Cabinet PDU

The PDU in the expansion cabinet directs power to the bulk power supplies. This PDU has a main power switch, three convenience outlets, and two fuses (one line and one neutral). This PDU supports up to eight 48-volt bulk power supplies. The PDU has two line cables, each feeding four supplies.

Always turn off power to the expansion cabinet using only the main power switch on the PDU.

Main Power Supply

Each main power supply in the base cabinet has three LEDs. During normal operation, the AC and DC LEDs light green to indicate the system is receiving proper power. If the ALM LED lights yellow, the power supply failed. Contact your authorized Auspex service representative to replace main power supplies.

Figure 5-1 shows the location of the main power supply LEDs.

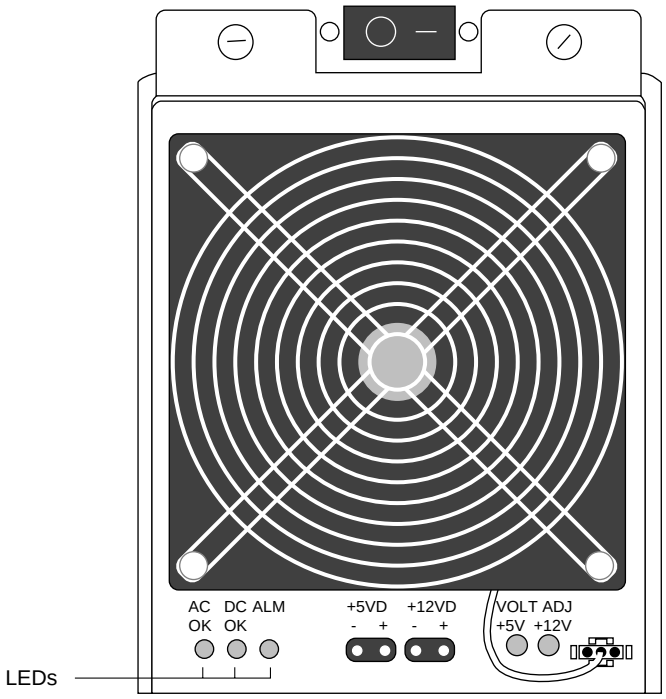


Figure 5-1. Main power supply LEDs

Caution: The power switch at the top of each main power supply should always be turned ON (—). Refer to Chapter 4 for proper shutdown procedures.

Table 5-1 lists main power supply LED status.

Table 5-1. Main power supply LED status

LEDs	Status	Required action
Green LEDs	Fully operational.	None.
Yellow LED	Supply failed.	Replace main power supply.
None	The main power supply is not receiving AC power, or has a catastrophic failure.	Check the power cable connection at the wall outlet and system power switch on the PDU. Contact your authorized Auspex service representative for assistance.

Note: If you are running a redundant main power supply configuration, the NetServer will operate normally on two main power supplies. The failed main power supply should be replaced immediately to return the server to a redundant state. For redundant power subsystems, a failed main power supply can be hot-plugged without interrupting power to the system.

Bulk Power Supplies

In an NS 7000/800, the bulk power supplies provide power to the HDDAs. One bulk power supply is required per HDDA. The bulk power supplies occupy up to three slots in the base cabinet power shelf and up to six slots in the expansion cabinet power shelf.

Figure 5-2 shows the bulk power supply LEDs.

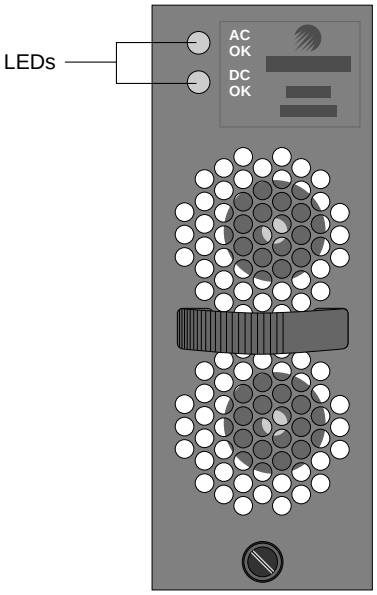


Figure 5-2. Bulk power supply LEDs

Each bulk power supply has two green LEDs: AC OK and DC OK. During normal operation, the AC OK LED lights to indicate the bulk power supply is receiving AC power. The DC OK LED lights to indicate the bulk power supply is providing DC power. If either LED is off, the bulk power supply failed.

Note: Contact your authorized Auspex service representative for assistance with replacing a bulk power supply.

The bulk power supplies have no ON or OFF switch. To power off the base cabinet or expansion cabinet, always use the main power switch on the PDU (refer to Chapter 4 for proper shutdown procedures).

Table 5-2 lists LED status for the bulk power supplies.

Table 5-2. Bulk power supply LED status

LEDs	Status	Required action
AC OK LED on DC OK LED on	Supply is receiving AC power. Supply is distributing DC power.	None.
AC OK LED on DC OK LED off	One of the power supply modules failed.	Bulk power supply needs to be replaced. Contact your authorized Auspex service representative for assistance.
AC OK LED off DC OK LED off	Supply failure.	Replace bulk power supply. Contact your authorized Auspex service representative for assistance.

Note: If you are running a redundant power supply configuration, the NetServer will operate normally on one power supply. However, the failed power supply should be replaced immediately to return to redundant state. The NetServer must be shut down to replace the power supply.

Disk DC Converter (DCC)

The Disk DCC converts the 48-volt power from the bulk power supplies into 5 and 12-volt power for the disk drives in the drive drawer.

Each Disk DCC has one green LED. During normal operation, the LED lights to indicate the Disk DCC is receiving 48-volt power and that the 5 and 12-volt disk drive power supply voltages are operating normally. If the LED is off, the Disk DCC failed.

Figure 5-3 shows the location of the Disk DCC LED.

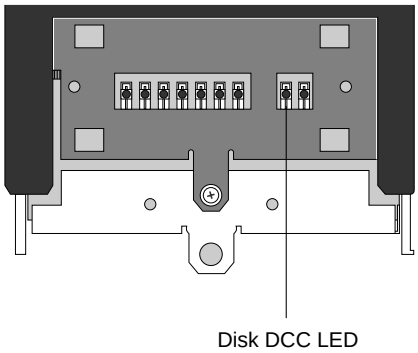


Figure 5-3. Disk DCC LED (drive drawer front panel)

Table 5-3 describes the Disk DCC LED.

Table 5-3. Disk DCC LED status

LED	Status	Required action
Green LED on	Supply is ok.	None.
Green LED off	Disk DCC failed; no input power to the Disk DCC.	Check the cable connections on the back of the HDDA, or the Disk DCC needs to be replaced. Contact your authorized Auspex service representative for assistance in replacing the Disk DCC.

HDDA Drive Drawer LEDs

Each HDDA drive drawer has 9 green and amber LEDs on the front door panel, indicating drive activity, disk DCC status, and HDDA chassis fan activity. These LEDs are described in the following sections.

Drive LEDs

There are 7 green drive LEDs on the front of each drive drawer to indicate drive activity. The LEDs are read from left to right, corresponding with each drive in the drive drawer. For example, if the left-most LED represents ad7, the right-most LED represents ad13.

Figure 5-4 shows the location of the drive LEDs.

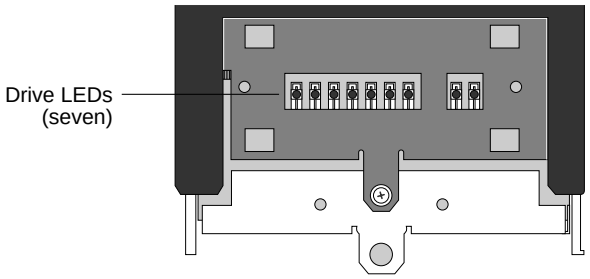


Figure 5-4. Drive LEDs (drive drawer front panel)

Table 5-4 describes the drive LEDs.

Table 5-4. Drive LED status

LEDs	Status	Required action
Green LED on	Drive is being accessed.	None.
Green LED off	Drive is not being accessed, or the drive has been removed.	None.

Disk DCC LED

Each Disk DCC has one green LED. During normal operation, the LED lights to indicate the Disk DCC is receiving 48-volt power and that the 5 and 12-volt disk drive power supply voltages are operating normally. If the LED is off, the Disk DCC failed.

Table 5-3 describes the Disk DCC LED.

Table 5-5. Disk DCC LED status

LED	Status	Required action
Green LED on	Disk DCC ok.	None.
Green LED off	Disk DCC failed; no input power to the Disk DCC.	Check the cable connections on the back of the HDDA, or the Disk DCC needs to be replaced. Contact your authorized Auspex service representative for assistance in replacing the Disk DCC.

Figure 5-3 shows the location of the Disk DCC LED.

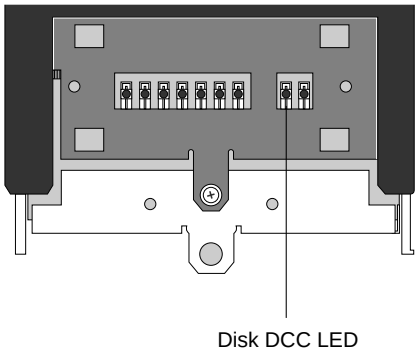


Figure 5-5. Disk DCC LED (drive drawer front panel)

Preventive Maintenance LED

The amber preventive maintenance LED lights to indicate problems with the HDDA. Table 5-6 describes the preventive maintenance LED.

Table 5-6. Preventive maintenance LED status

LEDs	Status	Required action
Amber LED off	HDDA ok.	None.
Amber LED on	One or more HDDA fans is slowing down and may fail; HDDA needs attention.	Contact your authorized Auspex service representative for assistance.

Figure 5-6 shows the location of the preventive maintenance LED.

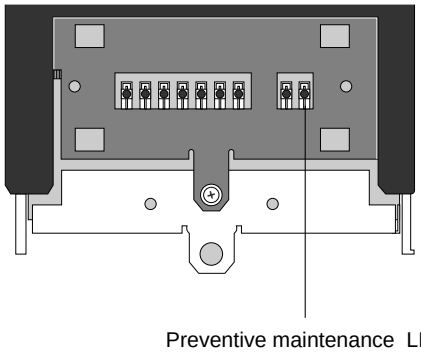


Figure 5-6. Preventive maintenance LED

Cleaning the NetServer Air Filter

Check the NetServer base cabinet air filter once a month, and clean if necessary. In environments where dust and dirt accumulate (such as during reconstruction or remodeling in or near the computer room), clean the air filter more frequently.

Caution: When handling the air filter, be careful not to damage the material.

To clean the NetServer air filter

1. Put on the antistatic wrist strap.
2. Open the front door panel.
3. Remove the screws securing the EMI screen with a Phillips screwdriver.
4. Lift the screen out of the slots at the bottom of the backplane. Refer to Figure 5-7 for location of EMI screen.

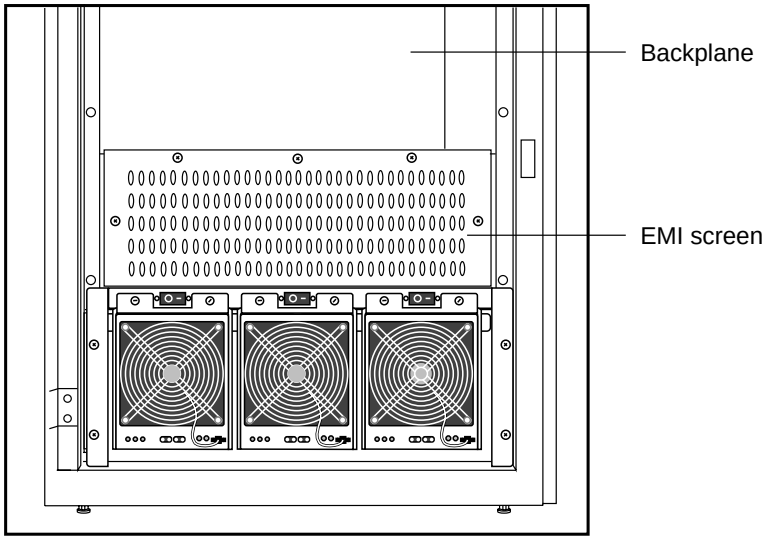


Figure 5-7. EMI screen location

5. Slide the air filter up until it slips free from the holding brackets (see Figure 5-8).

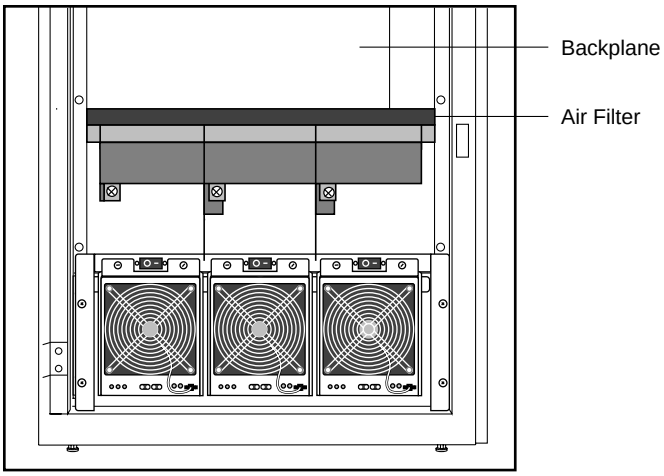


Figure 5-8. Air filter location (front view of base cabinet)

6. Vacuum the air filter thoroughly using the brush attachment of a household vacuum cleaner.

Note: Do not use a hand-held vacuum cleaner. Hand-held vacuum cleaners do not provide enough suction to clean the air filter adequately.

7. Slide the air filter back into its holder until the plastic frame is flush with the backplane.
8. Reattach the EMI screen.
9. Close the front door panel.

This completes the procedure for cleaning the NetServer base cabinet air filter.

Fan Trays and Fan Tray LEDs

This section describes the fan trays and fan tray LEDs in the NetServer.

The fans in the base cabinet are located below the backplane, behind the EMI screen. The fans are mounted horizontally in three fan trays (three fans per tray) and face upward.

Each fan tray has an LED indicating the status of the fan tray. The fan tray LEDs are located on the back of the fan trays and are visible from the back of the base cabinet. During normal operation, the green LED indicates the fan tray is operating properly. The amber LED indicates the fan tray needs to be replaced.

Note: Contact your authorized Auspex service representative for assistance with replacing the fan tray.

Figure 5-9 and Figure 5-10 show the locations of the fan trays and LEDs.

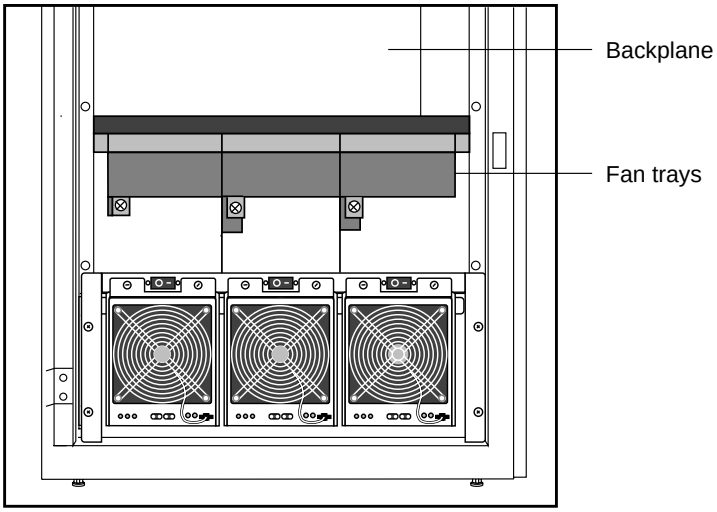


Figure 5-9. Fan trays (front view of base cabinet)

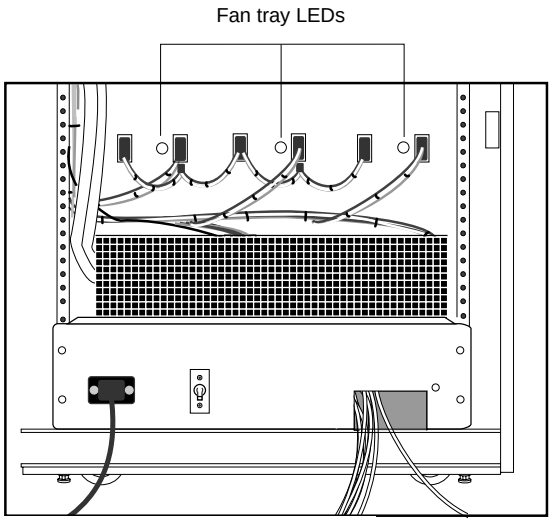


Figure 5-10. Fan tray LEDs (back view of base cabinet)

Processor Board LEDs

The Host Processor and Network Processor have several LEDs, which represent power-on self tests and system activity. By monitoring these LEDs, you can determine if the HP is functioning properly and whether or not you have proper network connectivity on the NP. This section describes the LEDs.

Host Processor

The Host Processor has three LEDs:

- The DIAG LED lights green, indicating that the system is performing power-on self tests.
- The READY LED lights green after the system successfully completes self tests.
- The Diagnostic LEDs light green, representing a specific diagnostic test being run on the HP when the NetServer is running in diagnostic mode. When the operating system is running, the LEDs light in an oscillating pattern, the speed of which is determined by the CPU load—the slower the speed, the higher the load.

Network Processor

The Network Processor consists of network interfaces each having their own set of LED displays. The network LED functions are described as follows.

ATM LEDs

Each ATM SBus card has two LEDs:

- The Receive Status LED lights green when receiving data or red when there is no carrier. If the light is red, check to see if the cable is properly attached or if the other end is up and ready. The normal condition is off, meaning the device is idle and ready to receive.
- The Transmit Status LED lights green when transmitting data or yellow when a SONET alarm condition is declared. The SONET alarm indicates trouble with the receiving device. If the light is yellow, check to see if the cable is properly attached or if the other end is up and ready. The normal condition is off, meaning the device is idle and ready to transmit.

Figure 5-11 shows the location of the LEDs on the ATM SBus card.

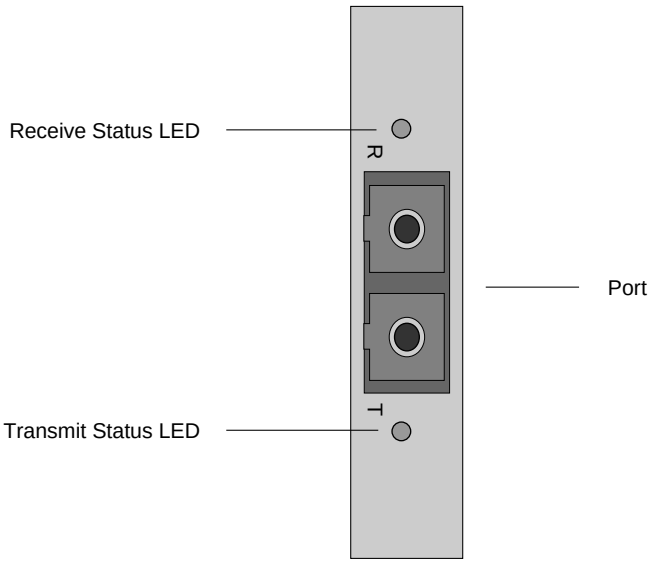


Figure 5-11. ATM (fiber) LEDs

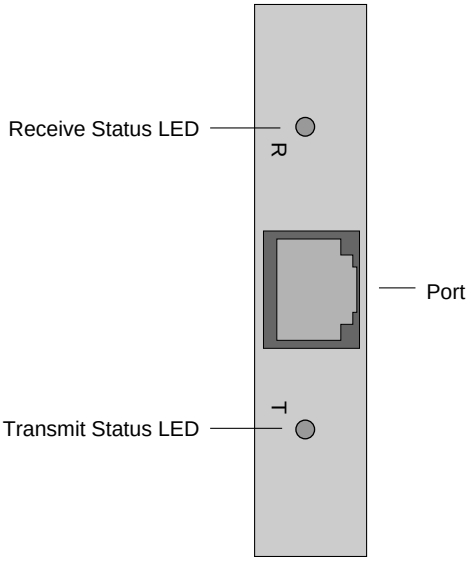


Figure 5-12. ATM (UTP) LEDs

FDDI-SAS LEDs

Each FDDI-SAS port has two LEDs:

- The Status LED lights green when the card passed internal diagnostics. The card functions properly only if it passed internal diagnostics.
- The RingOP LED lights green when the card is connected to the ring. If this LED is not lit, check if the cables are properly connected and you have followed the proper procedure for powering on the NetServer.

Figure 5-13 shows the location of the LEDs for the fiber FDDI-SAS port. Figure 5-14 shows the location of the LEDs for the MLT-3 FDDI-SAS port.

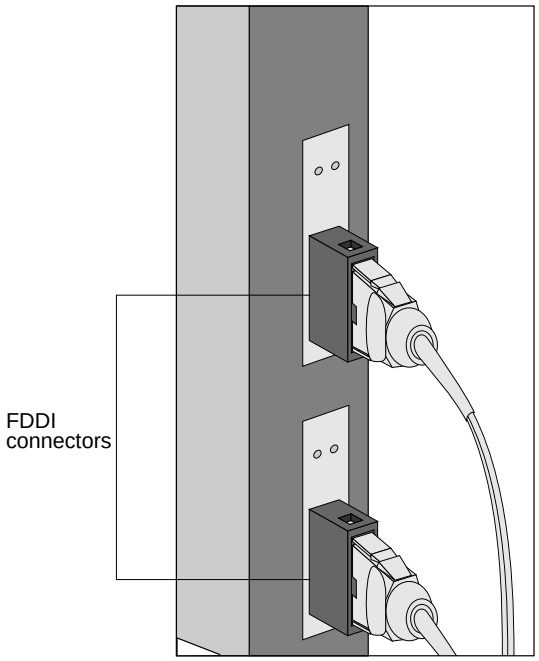


Figure 5-13. FDDI-SAS (fiber) LED display

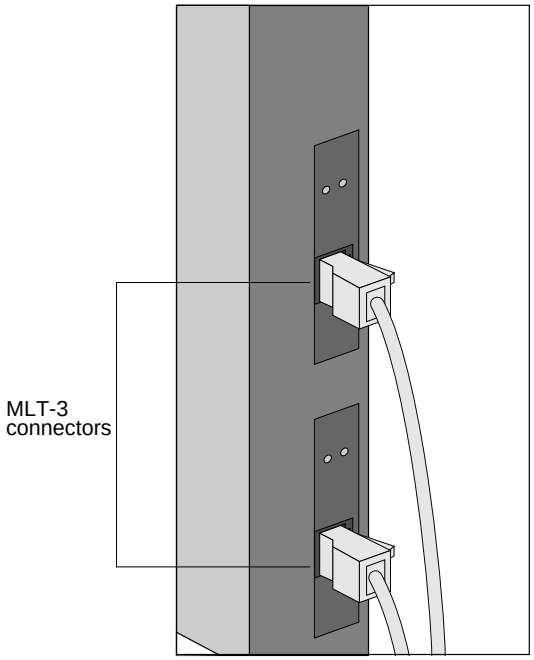


Figure 5-14. FDDI-SAS (MLT-3) LED display

FDDI-DAS LEDs

Each FDDI-DAS port has two LEDs:

- The STATUS LED lights green when the SBus card passed its internal diagnostics. This LED must be lit for the SBus card to function properly.
- The RingOP LED lights green when the card is connected to the ring. If this LED is not lit, check if the cables are properly connected and you have followed the proper procedure for powering on the NetServer.

Table 5-7 shows an example of LED states that may occur during operation.

Table 5-7. RingOP LED indicators on the FDDI-DAS SBus card

	RingOP B* - Off	**RingOP B - Green**	**RingOP B - Orange**
RingOP A* - Off	Ring is not operational	Station is in WRAP_B, ring is operational.	Ring is not operational. The station connected to the PHY B is attempting to connect but failed.
RingOP A - Green	Station is in WRAP_A, B is not connected.	Station is in THRU mode, ring is operational.	Station is in WRAP_A. The station connected to PHY B is attempting to connect but failed.
RingOP A - Orange	Ring is not operational. The station connected to PHY A is attempting to connect but failed.	Station is in WRAP_B. The station connected to PHY A is attempting to connect but failed.	Ring is not operational. The stations connected to PHYs A and B are attempting to connect but failed.

* RingOP A refers to the RingOP LED for port A. RingOP B refers to the RingOP LED for port B.

Figure 5-15 shows the locations of the LEDs for a FDDI-DAS connection.

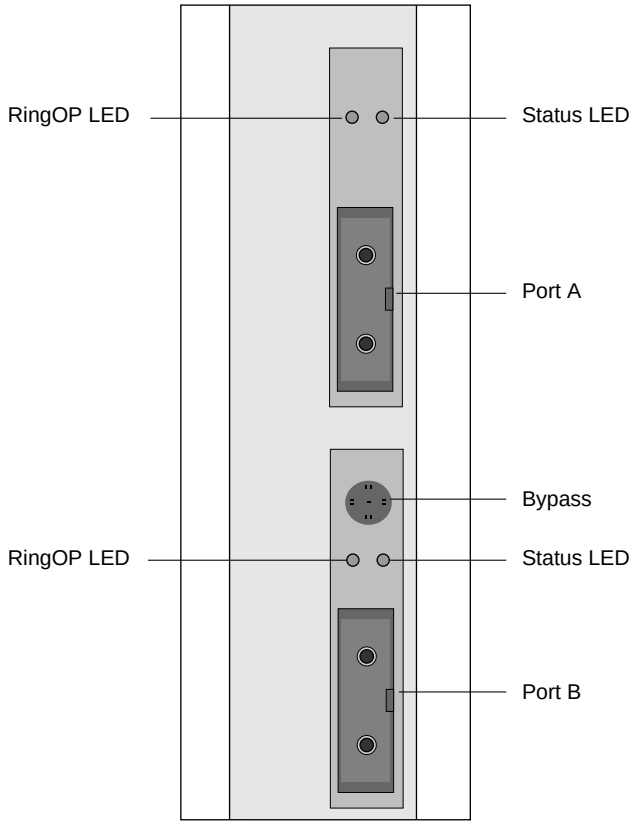


Figure 5-15. FDDI-DAS LED display

Quad Ethernet LEDs

Each Quad Ethernet SBus card has four green LEDs that light to indicate occurring activity through the ports. The LEDs are labeled **0** through **3**. The LED labeled **0** corresponds with port 3 and the LED labeled **3** corresponds with port 0.

Note: Quad Ethernet network interface numbering does not correspond with the LED numbering on the SBus card. Refer to Chapter 3 or more information on Quad Ethernet interface numbering.

Figure 5-16 shows the location of the LEDs on Quad Ethernet SBus cards.

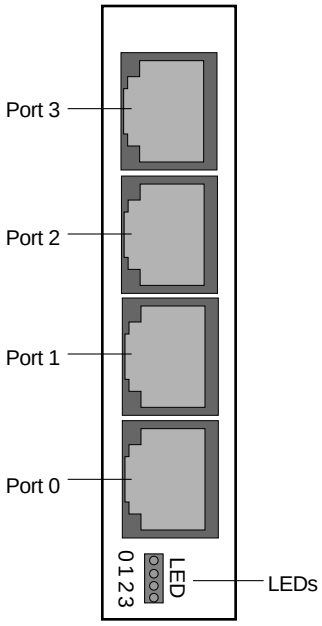


Figure 5-16. Quad Ethernet LEDs

A Drive Configuration Options

About This Appendix

This appendix provides guidelines and configuration options for disk, tape, and CD-ROM drives, and provides procedures for adding, removing, and replacing drives in the seven-slot drive rack and HDDA drive drawers.

The following sections are covered in this appendix:

- Drive Configuration Guidelines
- Drive Naming Conventions
- Sample Drive Configurations
- Adding, Removing, and Replacing Drives

Drive Configuration Guidelines

This section provides guidelines for configuring disk, tape, and CD-ROM drives with your NetServer. Use the following guidelines to determine where to install your new drives:

Acceptable drive types	The seven-slot drive rack in the base cabinet supports 3.5-inch disk drives, 8-mm tape drives, and CD-ROM drives. The HDDA drive drawers support Auspex 3.5-inch disk drives with SCA connectors.
Minimum and maximum configurations	The minimum configuration for the base cabinet is one root disk drive installed in slot 0 of the seven-slot drive rack, and one CD-ROM drive. The maximum configuration for the base cabinet is 63 drives. The maximum configuration for the expansion cabinet is 140 drives. Combinations of disk, tape, and CD-ROM drives are supported in the base cabinet seven-slot drive rack, as long as you have one root disk drive installed. The HDDA drive drawers support only disk drives.
Drive locations	Drives in the base cabinet seven-slot drive rack are numbered from left to right. The HDDA drive drawers are numbered left to right from the bottom rack to the top. Drives within the HDDA drive drawers are numbered right to left from front to back. If the server is being booted from a CD-ROM, the CD-ROM drive must be installed in slot 1 of the base cabinet.

Drive Naming Conventions

The naming conventions differ with each type of disk, tape, or CD-ROM drive installed in the NetServer. This section describes the naming conventions for each type of drive. For examples of drive configurations, see “Sample Drive Configurations” on page A-5.

Disk Drives

Drive names are derived from the slots in which they are installed. For example, the disk drives installed in the seven-slot drive rack are addressed **ad0** through **ad6** (slots 0–6).

HDDA Drives

The HDDA has three components:

- HDDA chassis, which houses the drive drawers
- Drive drawers, which house the disk drives
- Disk drives, which are installed in the drawers

The base cabinet contains up to two HDDA chassis. Each chassis contains up to four drive drawers. The bottom chassis is named HDDA 1, and the top chassis is named HDDA 2.

The drive drawers, which house the HDDA drives, are numbered 1 to 4 from left to right in each HDDA chassis. The drives inside the drawers are numbered right to left, from front to back, as shown in Figure A-2 on page A-5.

The disk drives installed in the first drive drawer of the base cabinet are addressed **ad7** through **ad13** (Drawer 1, slots 7-13). The disks in the second drive drawer are addressed **ad14** through **ad20** (Drawer 2, slots 14-20). The drive addressing continues sequentially up to **ad62** in the base cabinet.

The expansion cabinet contains up to five HDDA chassis, which are numbered sequentially from bottom to top; the bottom chassis is named HDDA 1, and the top chassis is named HDDA 5.

The disk drives installed in the first drive drawer of the expansion cabinet are addressed **ad63** through **ad69** (Drawer 1, slots 63-69). The disks in the second drive drawer are addressed **ad70** through **ad76** (Drawer 2, slots 70-76). The drive addressing continues sequentially up to **ad203** in the expansion cabinet.

Figure A-3 and Figure A-4 show drive numbering in the base and expansion cabinets.

Tape Drives

Tape drives are numbered according to the drive slot they occupy. Tape devices are addressed as **rast*n***, where *n* is a drive slot number in the range of 0 to 6.

CD-ROM Drives

CD-ROM drives are numbered according to the drive slot they occupy. However, in software commands, how you refer to a CD-ROM drive depends on the command type. Table A-1 lists the naming conventions for a CD-ROM drive. The letter *n* corresponds to the drive slot in the range of 0 to 6. The letter *p* is the name of the partition.

Table A-1. CD-ROM drive naming conventions

Command	Naming convention	Examples
boot	ad*n*	b ad(0,1,1)
eject, **dumpfs**	acd*n*	eject acd1 dumpfs /dev/acd1
dkinfo	ad*n*	dkinfo ad1
mount (entire CD-ROM drive)	acd*n*	mount -t lfs -o fs=4.2 -r /dev/acd1 /mnt
mount (partition)	ad*np*	mount -t lfs -o fs=4.2 -r /dev/ad1a /mnt_ad1a

Sample Drive Configurations

The NetServer can be configured to the specific requirements of your site. This section provides common disk and CD-ROM drive configurations.

Figure A-1 and Figure A-2 show sample configurations for the drive rack and drive drawer. Figure A-2 assumes the drive drawer is the first drawer in the base cabinet; therefore, slot numbering is contiguous from the last slot (slot 6) in the drive rack.

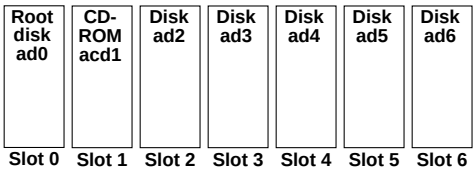


Figure A-1. Sample drive rack configuration (front view)

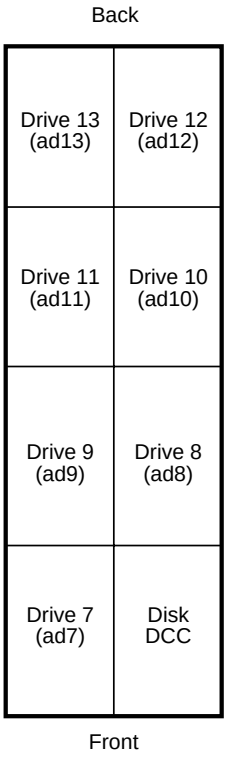


Figure A-2. Sample drive drawer configuration (top view)

The base cabinet supports one seven-slot drive rack, and up to two HDDAs, for a total of 63 drives. Each expansion cabinet supports up to five HDDAs or 140 drives.

Figure A-3 and Figure A-4 illustrate the drive names in a base cabinet and expansion cabinet.

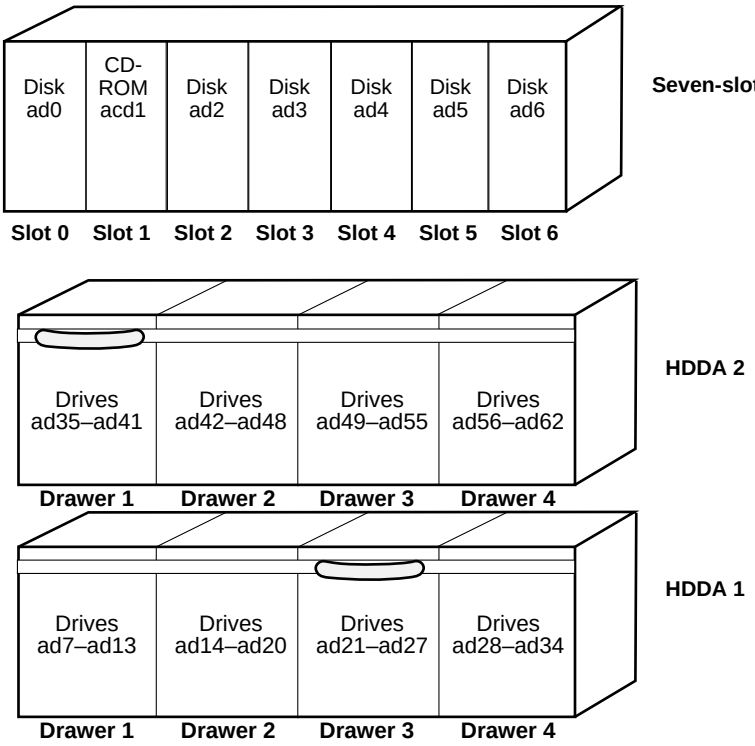


Figure A-3. Base cabinet drive names

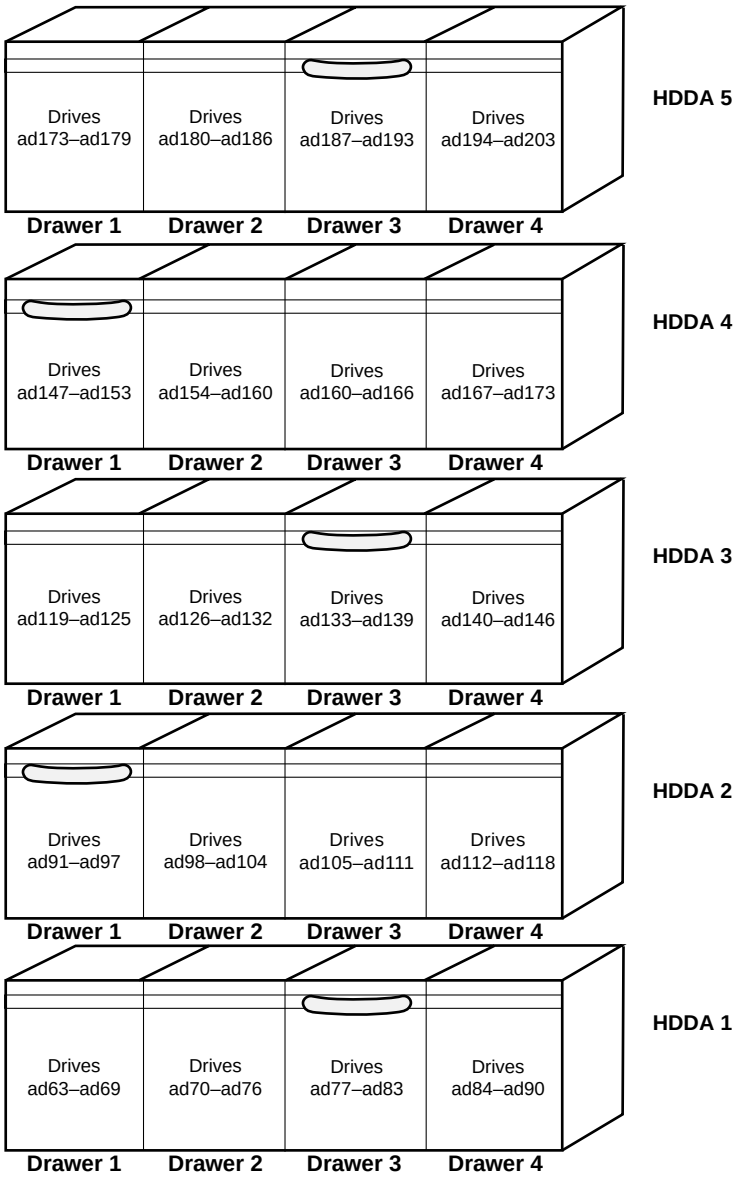


Figure A-4. Expansion cabinet drive names

Adding, Removing, and Replacing Drives

This section provides the procedures for adding, removing, and replacing drives in the seven-slot drive rack and HDDA drive drawers. The seven-slot drive rack accepts 3.5-inch disk and CD-ROM drives. The drive drawers accept only 3.5-inch disk drives with SCA connectors. Refer to “Sample Drive Configurations” on page A-5 for more information on drive naming and numbering.

Caution: The root disk drive, which contains the system software, can be installed or removed only when the NetServer is powered off. Follow the instructions in Chapter 4 to shut down and power off the server if you are removing the root drive.

Caution: Because disk drives are addressed by their physical slot numbers, removing an existing disk drive affects the corresponding entries in */etc/fstab* and */etc/vpartab* and might affect other scripts and procedures. Refer to the *System Manager’s Guide* for more information.

Adding, Removing, and Replacing Drives in the Drive Rack

Drives in the seven-slot drive rack can be added and removed when the NetServer is running. The procedures in this section describe adding, removing, and replacing drives on an operational NetServer. Refer to Chapter 4 of the *System Manager’s Guide* for additional information about the **ax_hot_plug**(8) command.

Note: You can add multiple drives in one operation; however, the procedure varies somewhat from adding a single drive. Review the steps in this section before proceeding.

To add a drive in the drive rack

1. Put on the antistatic wrist strap and wear it throughout this procedure.

   Caution: When handling any components of the NetServer, be sure to use the antistatic wrist strap to prevent electrostatic damage to the equipment.

2. If you need to remove an empty drive carrier or drive slot cover to accommodate a disk or CD-ROM drive, remove it now. If your server contains drive slot covers, use your fingers or a pair of pliers to pinch the fold located at the top left of the cover to release it from the drive slot.
3. Remove the drive from its packing material.
4. Place the label on the drive carrier that corresponds to the slot in which you are installing it (labels with all the possible drive numbers are shipped with the server), and place the new drive near the NetServer.
5. Gain access to the NetServer on the system console.
6. Enter the **ax_hot_plug** command specifying the slot number of the drive. For example, to add a drive in slot 2, enter:

   ```
   # ax_hot_plug add 2
   ```

To add multiple drives, enter the **ax_hot_plug** command specifying all of the drives you want to add. For example, to add drives to slots 2, 3, 4, and 6, enter the following command:

```
# ax_hot_plug add 2-4 6
```

The system responds with:

```
adding device 2.
All activity on SP0 has been stopped.
Insert or replace the device.
**WARNING** Make sure you insert the drive in the proper slot.
            Otherwise, you may crash the system.
Press the <RETURN> key when you are finished:
```

Note: Insert the drive as soon as possible. Until you press the Return key (in step 9), programs running on the HP wait for I/O operations to complete. This may cause time-outs on clients making NFS requests.

7. Holding the drive by the handle and cradling it with your other hand, gently slide the drive into the slot until the small latch button on the drive carrier clicks into the hole in the drive slot. If this latch button obstructs the drive from sliding into the slot, press the button on the drive handle to retract it and complete the installation. Refer to Figure A-5.

Caution: Do not slam the drives into the slots. Jarring can cause damage to the drives and connectors.

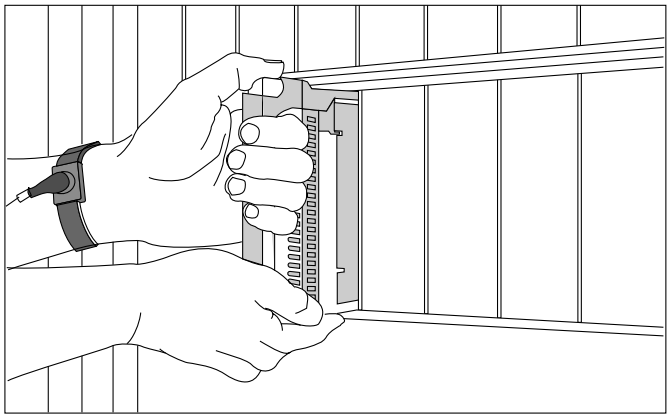


Figure A-5. Inserting a drive in the seven-slot drive rack

Drives install in only one direction. If the drive does not slide in easily or the latch does not click into place, remove the drive and try again. Make sure the drive is in the correct position, with the latch button at the top of the handle.

8. Repeat step 7 to add other drives to empty slots in the drive rack. Using the **ax_hot_plug** example above, add drives 3, 4, and 6 at this time.

9. Press the Return key on the system console. The system responds:

```
ad2: <SEAGATE ST15150N          4611, 4094 MBs>
added device 2.
```

If you are adding multiple drives, the system prompts you to add the next one. Press the Return key for each drive you already added in step 8. Using the **ax_hot_plug** example on page A-9, press the Return key when the system prompts you to add drives 3, 4, and 6.

10. Follow the procedures outlined in the *System Manager's Guide* to partition the new drive, initialize it, and mount file systems on it.

This completes the procedure for adding a drive in the seven-slot drive rack. The drive is now ready for use.

To remove a drive from the drive rack

1. Put on the antistatic wrist strap and wear it throughout this procedure.

   Caution: When handling any components of the NetServer, be sure to use the antistatic wrist strap to prevent electrostatic damage to the equipment.

2. Gain access to the NetServer on the system console.

3. Enter the **ax_hot_plug** command specifying the slot number of the drive you want to remove. For example, to remove a drive in slot 2, enter:

   ```
   # ax_hot_plug remove 2
   ```

   To remove multiple drives, enter the **ax_hot_plug** command specifying all of the drives you want to remove. For example, to remove the drives from slots 2, 3, 4, and 6, enter the following command:

   ```
   # ax_hot_plug remove 2-4 6
   ```

   The system responds:

   ```
   removing device 2.
   All activity on SP0 has been stopped.
   Remove the device.
   Press the <RETURN> key when you are finished.
   ```

   Caution: When removing disk drives, allow approximately 20 seconds for the drive to spin down before physically removing the drive from the drive slot. Removing a disk drive while it is still spinning may cause damage to the drive.

   Only one drive can be removed at a time. You must wait for the prompt on the system console specifying the drive is ready before removing multiple drives.

   Note: Remove the drive as soon as possible. Until you press the Return key in step 5, programs running on the HP wait for I/O operations to complete. This may cause time-outs on clients making NFS requests.

4. Release the latch button by pressing the trigger on the drive, and use both hands to remove the drive from its slot.

   Caution: Because disk drives are addressed by their physical slot numbers, removing an existing disk drive affects the corresponding entries in */etc/fstab* and */etc/vpartab* and might affect other scripts and procedures. Refer to the *System Manager's Guide* for more information.

5. Press the Return key on the system console to register that the drive has been removed. The system responds:

   ```
   ad2: removed
   removed device 2.
   ```

6. Repeat step 4 through step 5 for each drive you are removing, if you are removing more than one.

This completes the procedure for removing a drive in the seven-slot drive rack.

To replace a drive in the drive rack

1. Put on the antistatic wrist strap and wear it throughout this procedure.

   Caution: When handling any components of the NetServer, be sure to use the antistatic wrist strap to prevent electrostatic damage to the equipment.

2. Remove the new drive from its packing material.
3. Gain access to the NetServer on the system console.
4. Enter the **ax_hot_plug** command specifying the slot number of the drive you want to replace. For example, to replace a drive in slot 2, enter:

   # **ax_hot_plug replace 2**

   To replace multiple drives, enter the **ax_hot_plug** command specifying all of the drives you want to replace. For example, to replace the drives in slots 2, 3, 4, and 6, enter the following command:

   # **ax_hot_plug replace 2-4 6**

   The system responds:

   ```
   adding device 2.
   All activity on SP0 has been stopped.
   Insert or replace the device.
   **WARNING** Make sure you insert the drive in the proper slot.
               Otherwise, you may crash the system.
   Press the <RETURN> key when you are finished:
   ```

   Caution: Only one drive can be replaced at a time. You must wait for the prompt on the system console specifying the drive is ready before replacing multiple drives.

   Note: Replace the drive as soon as possible. Until you press the Return key in step 7, programs running on the HP wait for I/O operations to complete. This may cause time-outs on clients making NFS requests.

5. Release the latch button by pressing the trigger on the drive, and use both hands to remove the drive from its slot.

   Caution: Because disk drives are addressed by their physical slot numbers, removing an existing disk drive affects the corresponding entries in */etc/fstab* and */etc/vpartab* and might affect other scripts and procedures. Refer to the *System Manager's Guide* for more information.

6. Holding the new drive by the handle and cradling it with your other hand, gently slide the drive into the slot until the small latch button on the drive carrier clicks into the hole in the drive slot. If this latch button obstructs the drive from sliding into the slot, press the button on the drive handle to retract it and complete the installation. Refer to Figure A-6.

   Caution: Do not slam the drives into the slots. Jarring can cause damage to the drives and connectors.

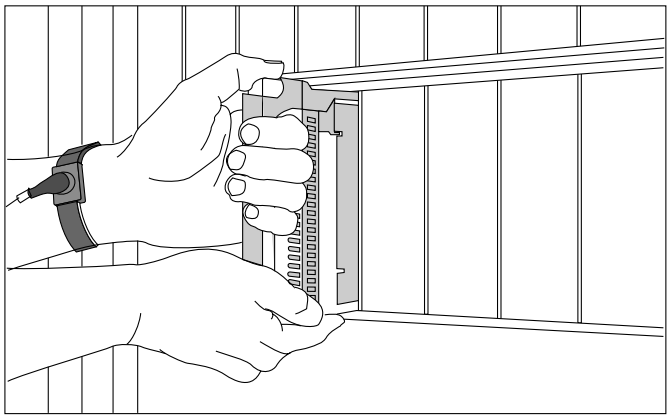


Figure A-6. Inserting a drive in the seven-slot drive rack

Drives install in only one direction. If the drive does not slide in easily and the latch does not click into place, remove the drive and try again. Make sure the drive is in the correct position with the latch button at the top of the handle.

7. Press the Return key on the system console. The system responds:

```
ad2: removed
ad2: <SEAGATE ST15150N        4611, 4094 MBs>
added device 2.
```

   If you are replacing multiple drives, the system prompts you to replace them now. Repeat step 5 through step 7 for each drive you want to replace.

8. Follow the procedures outlined in the *System Manager's Guide* to partition the new drive, initialize it, and mount file systems on it.

This completes the procedure for replacing a drive in the seven-slot drive rack. The drive is now ready for use.

Adding, Removing, and Replacing HDDA Drives

Each HDDA drive drawer supports up to seven disk drives. The drives within each drive drawer are numbered consecutively from right to left and front to back.

Each drive in the HDDA is "hot-pluggable," meaning you do not need to power down the entire NetServer before adding drives. The procedures in this section describe both adding and removing a drive in a drive drawer on an operational NetServer.

Note: The add and remove procedures provide the option to add or remove multiple drives in the same drawer at one time, without opening and closing the drawer for each drive. The procedure for replacing a drive requires that you replace only one drive at a time; that is, you must open and shut the drawer for each drive you replace.

To add an HDDA drive in a drive drawer

1. Put on the antistatic wrist strap and wear it throughout this procedure.

   Caution: When handling any components of the NetServer, be sure to use the antistatic wrist strap to prevent electrostatic damage to the equipment.

2. Remove the new drive from its packing material.
3. Locate the HDDA drive drawer key and place it near the NetServer. If the NetServer is powered off, skip to step 6.
4. Gain access to the NetServer on the system console.
5. Enter the **ax_hot_plug** command specifying the slot number of the drive.

   For example, to add a drive in slot 8 (ad8), enter:

   ```
   # ax_hot_plug add 8
   ```

   To add multiple drives, enter the **ax_hot_plug** command specifying all of the drives you want to add. For example, to add drives to slots 8, 9, and 10 (ad8 to ad10) in drawer 1 and slots 14 and 15 (ad14, ad15) in drawer 2, enter the following command:

   ```
   # ax_hot_plug add 8-10 14,15
   ```

   The system responds:

   ```
   adding device 8.
   All activity on SP0 has been stopped.
   Insert or replace the device.
   **WARNING** Make sure you insert the drive in the proper slot.
               Otherwise, you may crash the system.
   Press the <RETURN> key when you are finished:
   ```

   Note: Add the drive as soon as possible. Until you press the Return key in step 17, programs running on the HP wait for I/O operations to complete. This may cause time-outs on clients making NFS requests.

6. Slide the drawer handle to the selected drive drawer.

7. Insert the HDDA drive drawer key and unlock the drawer by turning the key counter-clockwise, as shown in Figure A-7.

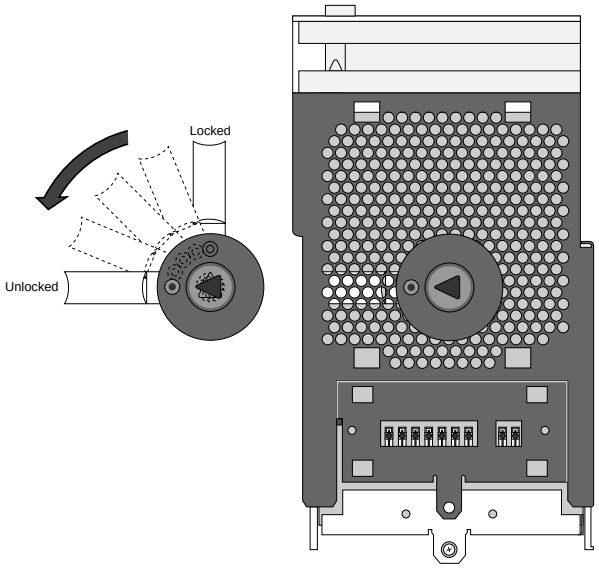


Figure A-7. Unlocking the HDDA drive drawer

8. Pull down on the drive drawer handle and slide the drawer out, as shown in Figure A-8.

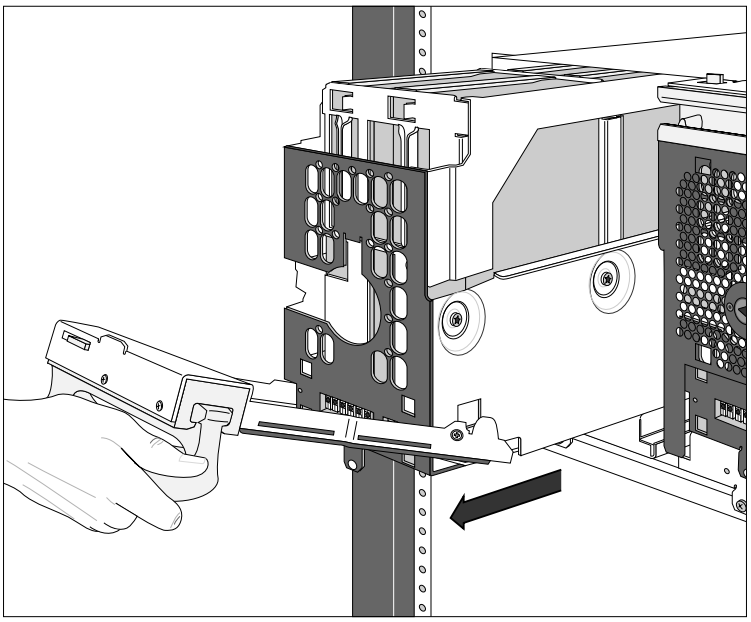


Figure A-8. Opening the drive drawer

Caution: Active drives in the drawer continue to spin during this procedure. This is normal and does not disrupt system operation. However, spinning drives can be damaged if the drawer is handled roughly.

9. Firmly hold the new drive by its handle. Using your other hand to support the drive (be careful not to touch the PCB components), lower it into the drive slot in the drive drawer as shown in Figure A-9.

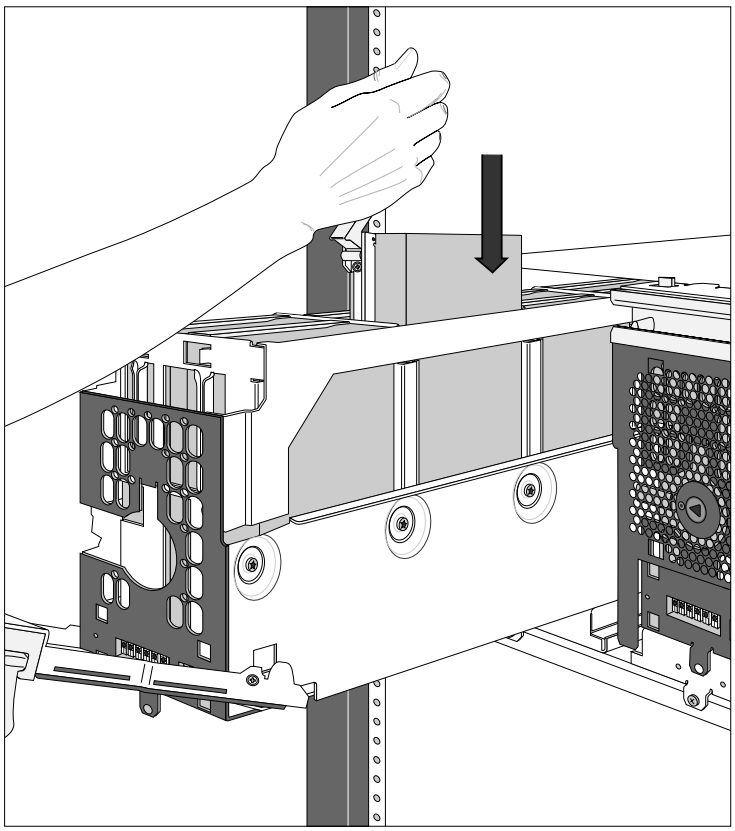


Figure A-9. Inserting a drive in a drive drawer

10. Seat the drive into position by firmly but gently pressing down on the handle.

    Drives install in only one direction. If the drive you are installing does not slide in easily, remove the drive and try again. Make sure the drive is in the correct position, as shown in Figure A-9.

11. Secure the drive using the retaining clip provided on the drive drawer frame (see Figure A-10).

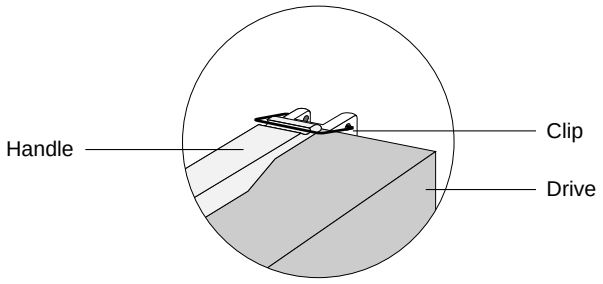


Figure A-10. Latching the HDDA drive into position

Caution: If the handle is not secured with the retaining clip, the handle may stick up and stop the drawer from being closed, thereby jarring the drawer and possibly damaging a spinning drive.

12. Repeat step 9 through step 11 to add other drives to empty slots in the same drawer. Using the **ax_hot_plug** example on page A-14, add drives 9 and 10 at this time. Do not add drives 14 and 15, as they are located in another drawer.
13. Slide the drawer back into the slot until it is about 3/4-inch from the HDDA chassis, as shown in Figure A-11.

Note: Be sure that the drawer faceplate is pulled down far enough to allow the cam lever at the bottom of the faceplate to clear the chassis. Once in position, the cam lever provides the cam action that firmly seats the drawer into the chassis once it is closed.

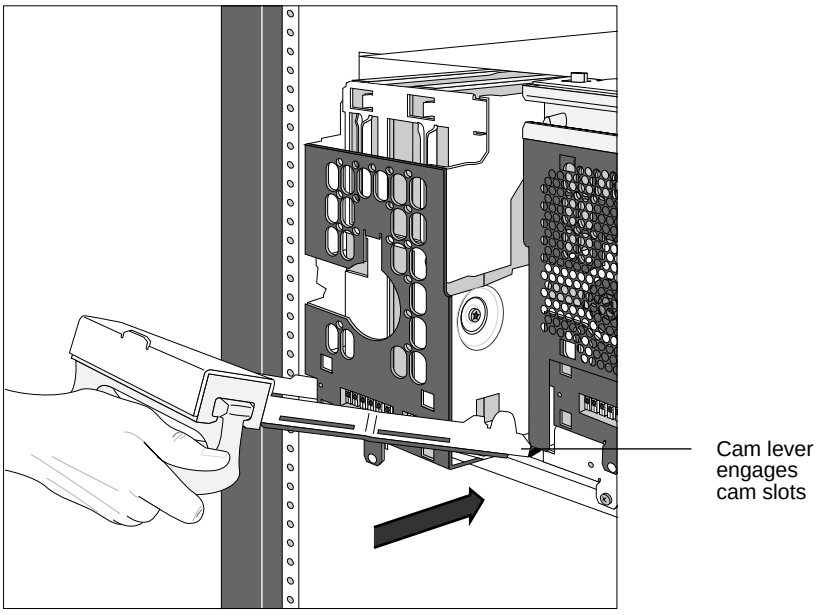


Figure A-11. Closing the HDDA drive drawer

Caution: Do not force the drive drawers into the drive drawer slots; doing so will damage the unit.

14. Push the drawer handle up so that the cam lever engages the cam slots in the HDDA chassis, as shown in Figure A-12.

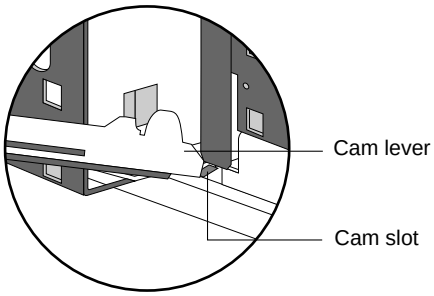


Figure A-12. Cam lever engaging in cam slot

15. Seat the drive drawer firmly into the drawer slot by pressing the handle closed, as shown in Figure A-13. The caming action of closing the handle seats the drive drawer properly.

    The drawer latch at the top left corner of the drive drawer clicks into position when the drawer is properly seated.

Caution: Do not force the drive drawers into the slots; doing so will damage the unit. If the drawer is not seated properly, move the handle to release the drawer latch, pull the drawer out, and try again.

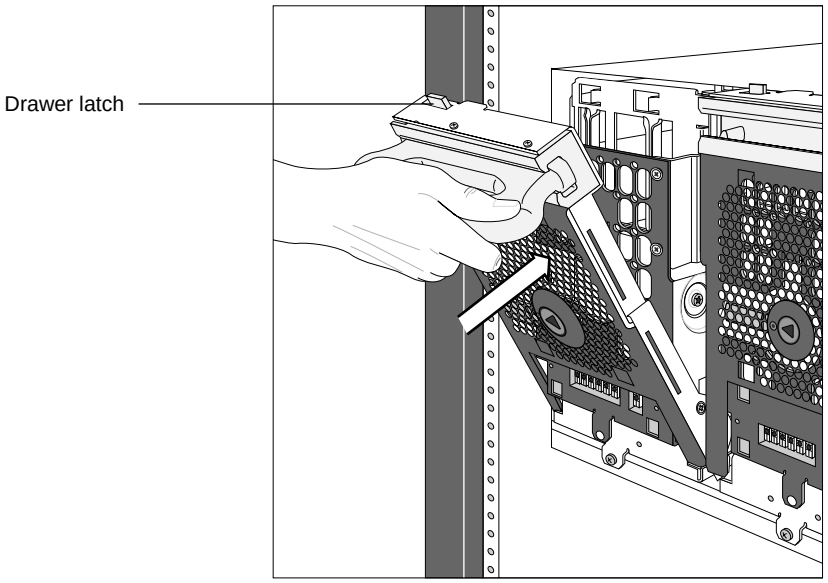


Figure A-13. Latching the HDDA drive drawer

16. Insert the drive drawer key and lock the drawer by turning the key clockwise, as shown in Figure A-14. If the NetServer is powered off, skip to step 18.

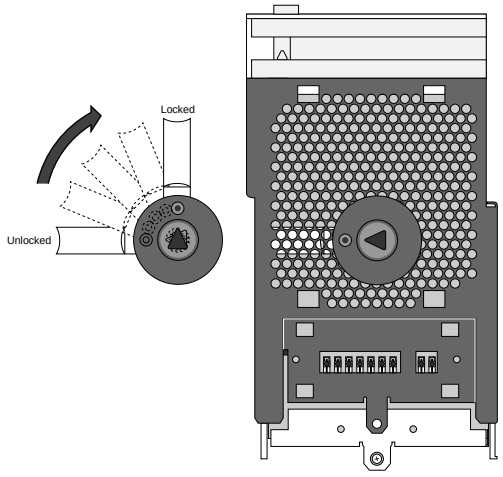


Figure A-14. Locking the HDDA drive drawer

17. Press the Return key on the system console. The system responds:

```
ad8: <SEAGATE ST15150N        4611; 4094 MBs>
added device 8.
```

    If you are adding multiple drives, the system prompts you to add the next drive now.

    If you installed multiple drives in this drawer, just press the Return key for each drive you already added. Using the **ax_hot_plug** example on page A-14, press the Return key when the system prompts you to add drives 9 and 10. You do not need to reopen the drawer.

    If you are installing drives in other drawers, repeat step 6 through step 17 for the other drives. Using the **ax_hot_plug** example on page A-14, when the system prompts you to add drive 14, repeat step 6 through step 17 to add drives 14 and 15.

18. Follow the procedures outlined in the *System Manager's Guide* to partition the new drive, initialize it, and mount file systems on it.

This completes the procedure for adding a drive in the drive drawer. The drive is now ready for use.

To remove an HDDA drive from a drive drawer

1. Prior to removing a drive, have an Electrostatic Discharge (ESD) bag handy to place the drive in once it has been removed.
2. Put on the antistatic wrist strap, and wear it throughout the procedure.
3. Locate the HDDA drive drawer key and place it near the NetServer. If the NetServer is powered off, skip to step 8.
4. Gain access to the NetServer on the system console.
5. Enter the **ax_hot_plug** command specifying the slot number of the drive.

   For example, to remove a drive in slot 8 (ad8), enter:

   ```
   # ax_hot_plug remove 8
   ```

   To remove drives from slots 8, 9, and 10 (ad8 to ad10) in drawer 1 and slots 14 and 15 (ad14, ad15) in drawer 2, enter the following command:

   ```
   # ax_hot_plug remove 8-10 14,15
   ```

   The system responds:

   ```
   removing device 8.
   All activity on SP0 has been stopped.
   Remove the device.
   Press the <RETURN> key when you are finished:
   ```

6. Go to step 8 if you are removing only one drive, or only one drive in a drawer. If you are removing more than one drive in the same drawer, continue with step 7.
7. Press the Return key if you are removing more than one drive in the same drawer. Do not open the drawer or remove the drive at this time.

   You can remove all of the drives in a drawer at the same time if you press the Return key for every drive *except the last drive in the drawer.* Using the above **ax_hot_plug** command in step 5 as an example, after you press the Return key, the system responds:

   ```
   ad8: removed
   removed device 8.
   removing device 9.
   All activity on SP0 has been stopped.
   Remove the device.
   Press the <RETURN> key when you are finished:
   ```

   Press the Return key again. The system prompts you to remove device 10. Do not press the Return key at this time because drive 10 is the last drive that you want to remove from this drawer. Continue with step 8 of this procedure to open the drawer and remove all three drives: 8, 9, and 10.

   Note: Remove the device as soon as possible. Until you press the Return key in step 19, programs running on the HP wait for I/O operations to complete. This may cause time-outs on clients making NFS requests.

8. Slide the drawer handle to the selected drive drawer.

9. Insert the HDDA drive drawer key and unlock the drawer by turning the key counter-clockwise, as shown in Figure A-15.

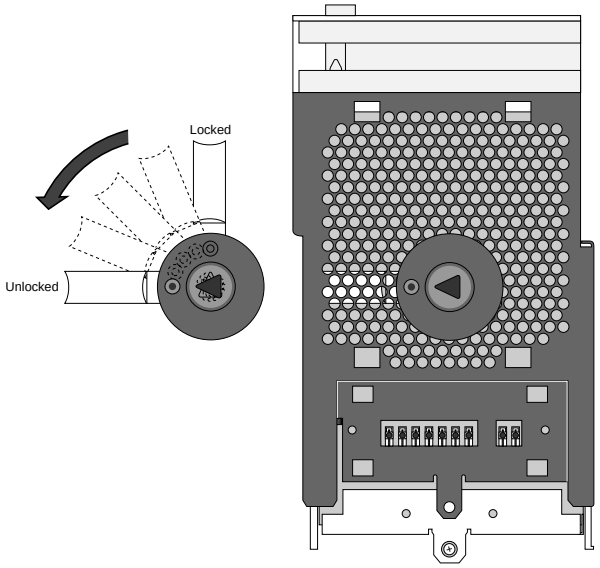


Figure A-15. Unlocking the HDDA drive drawer

10. Pull down on the drive drawer handle and slide the drawer out, as shown in Figure A-16.

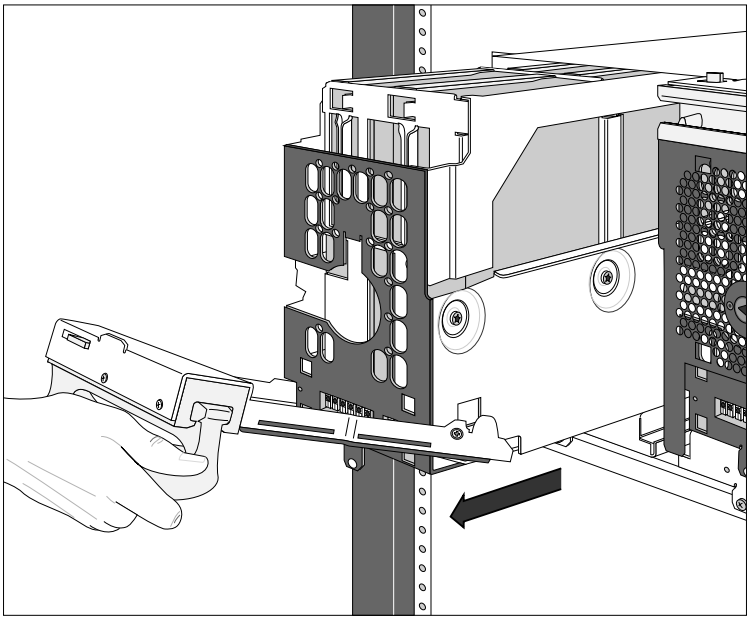


Figure A-16. Opening the drive drawer

Caution: Active drives in the drawer continue to spin during this procedure. This is normal and does not disrupt system operation. However, spinning drives can be damaged if the drawer is handled roughly.

11. Locate the drive and release the holding clip on the drive handle. See Figure A-17 for the location of the clip.

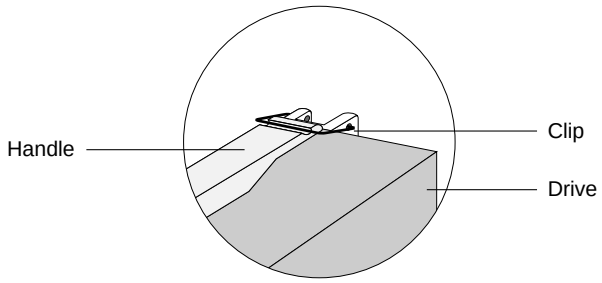


Figure A-17. Unlatching the HDDA drive

12. Firmly grab the drive by its handle, and lift the drive up and out of the drive slot (refer to Figure A-18). Use your other hand to support the drive if necessary.

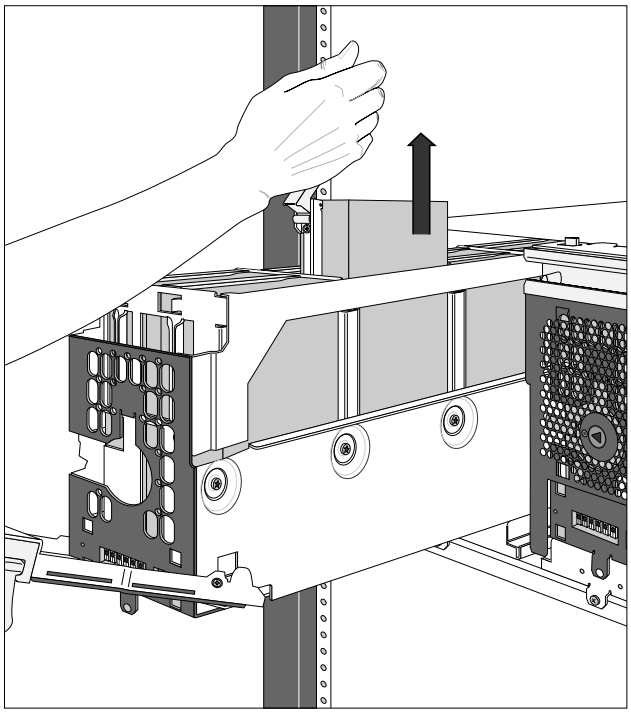


Figure A-18. Removing an HDDA disk drive

Note: It is normal for the drives to feel tight when removing them from the drive drawer for the first time.

13. Place the drive into the ESD bag.
14. Remove any other drives in this drawer that the system prompted you to remove (in step 7). Using the **ax_hot_plug** example on page A-20, remove drives 9 and 10 at this time.

15. Slide the drive drawer back into the slot until it is about 3/4-inch from the HDDA chassis, as shown in Figure A-19.

Note: Be sure that the drawer faceplate is pulled down far enough to allow the cam lever at the bottom of the faceplate to clear the chassis. Once in position, the cam lever provides the cam action that firmly seats the drawer into the chassis once it is closed.

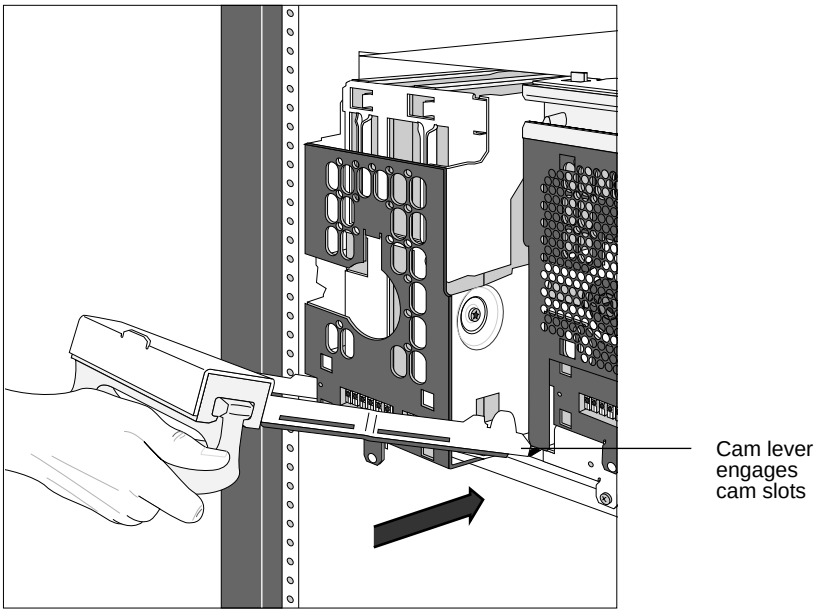


Figure A-19. Closing the HDDA drive drawer

Caution: Do not force the drive drawers into the drive drawer slots; doing so will damage the unit.

16. Push the drawer handle up so that the cam lever engages the cam slots in the HDDA chassis, as shown in Figure A-20.

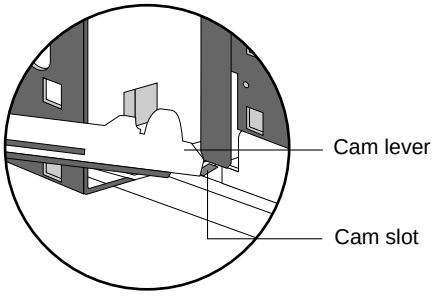


Figure A-20. Cam lever engaging in cam slot

17. Seat the drive drawer firmly into the drawer slot by pressing the handle closed, as shown in Figure A-21. The caming action of closing the handle seats the drive drawer properly.

    The drawer latch at the top left corner of the drive drawer clicks into position when the drawer is properly seated.

Caution: Do not force the drive drawers into the slots; doing so will damage the unit. If the drawer is not seated properly, move the handle to release the drawer latch, pull the drawer out, and try again.

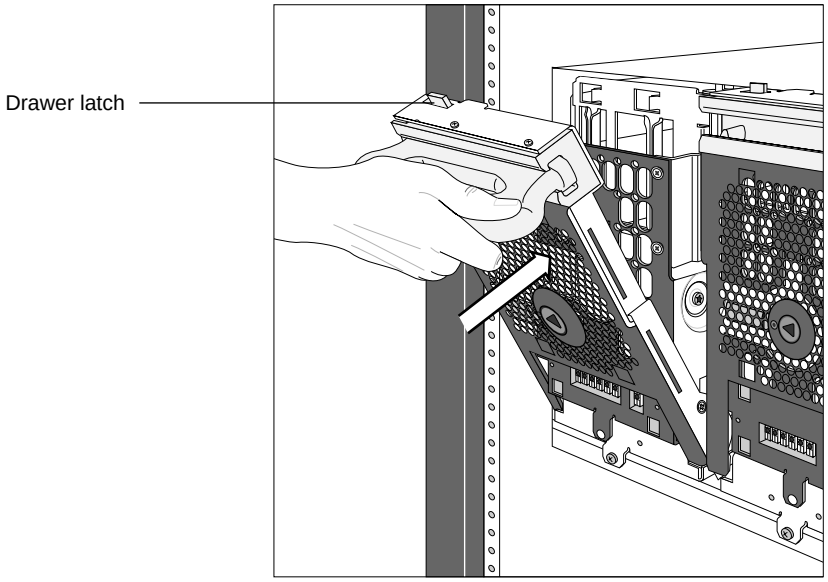


Figure A-21. Latching the HDDA drive drawer

18. Insert the drive drawer key and lock the drawer by turning the key clockwise, as shown in Figure A-22. If the NetServer is powered off, the procedure is complete, and skip to the end of this section.

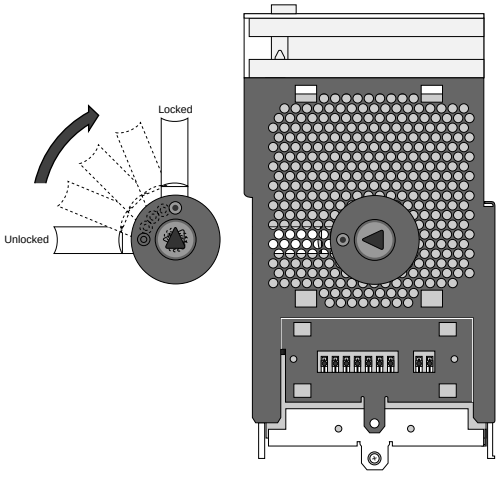


Figure A-22. Locking the HDDA drive drawer

19. Press the Return key on the system console after you have completed removing the drive(s) in the drawer. The system responds to indicate the drive is removed.

    For example, if you removed one drive, as shown in the first **ax_hot_plug** example on page A-20, the system responds:

    ```
    ad8: removed
    removed device 8.
    ```

    If you removed more than one drive in the drawer, as shown in the second **ax_hot_plug** example on page A-20, the system responds that the last drive is removed:

    ```
    ad10: removed
    removed device 10
    ```

    If you are removing drives from other drawers, the system prompts you to remove them now. Using the **ax_hot_plug** example on page A-20, the system prompts you to remove drive 14 at this point.

    ```
    removing device 14.
    All activity on SP0 has been stopped.
    Remove the device.
    Press the <RETURN> key when you are finished:
    ```

    Repeat step 6 through step 19 for the other drives you want to remove.

This completes the procedure for removing a drive from a drive drawer.

To replace an HDDA drive in a drive drawer

1. Prior to replacing a drive, have an Electrostatic Discharge (ESD) bag handy to place the old drive in once it has been removed.
2. Put on the antistatic wrist strap, and wear it throughout the procedure.
3. Remove the new drive from its packing material.
4. Locate the HDDA drive drawer key and place it near the NetServer. If the NetServer is powered off, skip to step 7.
5. Gain access to the NetServer on the system console.
6. Enter the **ax_hot_plug** command specifying the slot number of the drive.

   For example, to replace a drive in slot 8 (ad8), enter:

   ```
   # ax_hot_plug replace 8
   ```

   To replace drives in slots 8, 9, and 10 (ad8 to ad10) in drawer 1 and slots 14 and 15 (ad14, ad15) in drawer 2, enter the following command:

   ```
   # ax_hot_plug replace 8-10 14,15
   ```

   The system responds:

   ```
   adding device 8.
   All activity on SP0 has been stopped.
   Insert or replace the device.
   **WARNING** Make sure you insert the drive in the proper slot.
               Otherwise, you may crash the system.
   Press the <RETURN> key when you are finished:
   ```

   Caution: Only one drive can be replaced at a time. You must wait for the prompt on the system console specifying the drive is ready before replacing the next drive. For example, you must complete step 7 through step 19 for one drive before replacing another drive.

   Note: Replace each drive as soon as possible. Until you press the Return key in step 19, programs running on the HP wait for I/O operations to complete. This may cause time-outs on clients making NFS requests.

7. Slide the drawer handle to the selected drive drawer.

8. Insert the HDDA drive drawer key and unlock the drawer by turning the key counter-clockwise, as shown in Figure A-23.

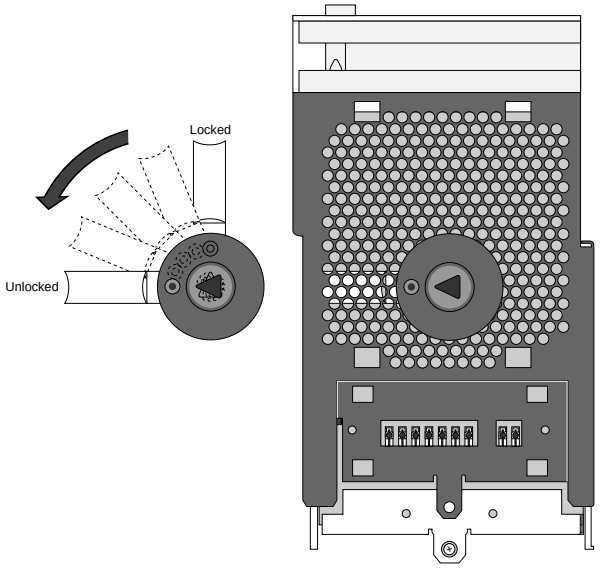


Figure A-23. Unlocking the HDDA drive drawer

9. Pull down on the drive drawer handle and slide the drawer out, as shown in Figure A-24.

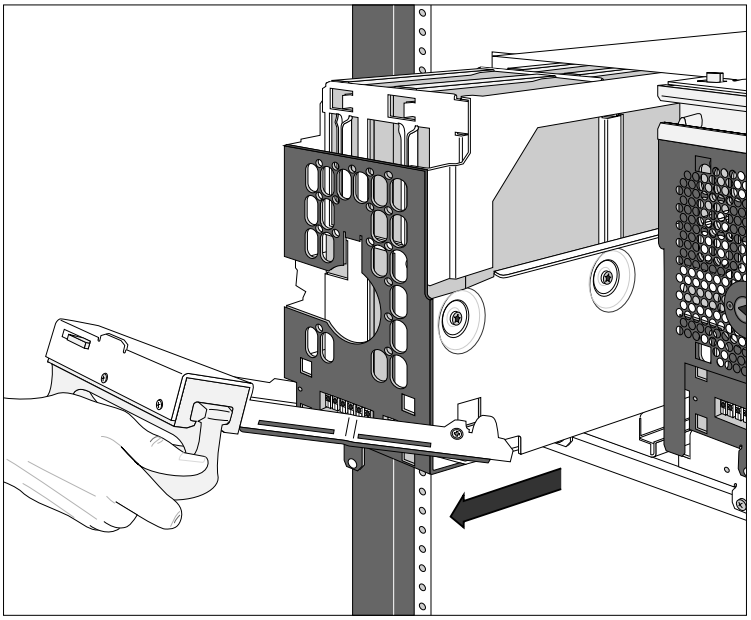


Figure A-24. Opening the drive drawer

Caution: Active drives in the drawer continue to spin during this procedure. This is normal and does not disrupt system operation. However, spinning drives can be damaged if the drawer is handled roughly.

10. Locate the drive and release the holding clip on the drive handle (see Figure A-25).

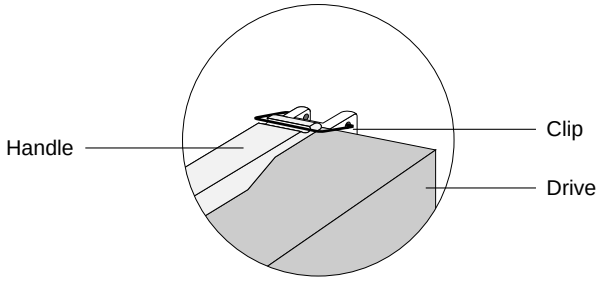


Figure A-25. Unlatching the HDDA drive

11. Firmly grab the drive by its handle, and lift the drive up and out of the drive slot (refer to Figure A-26). Use your other hand to support the drive if necessary.

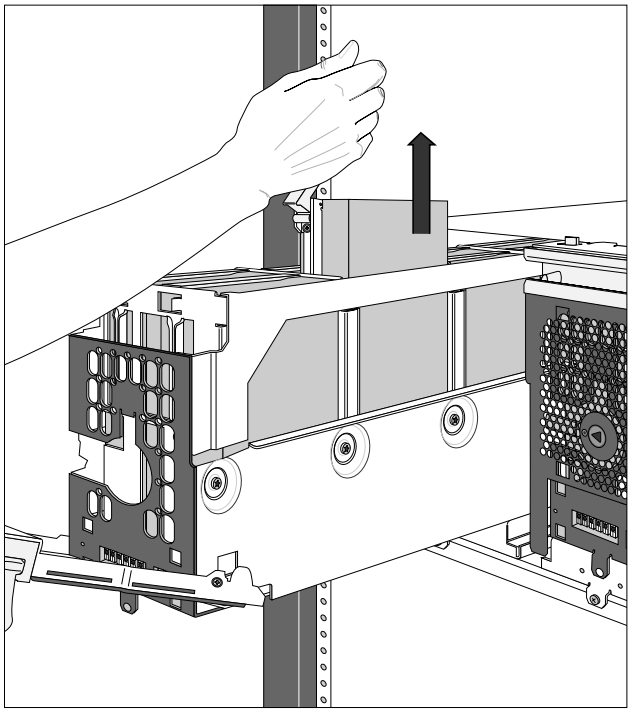


Figure A-26. Removing an HDDA disk drive

Note: It is normal for the drives to feel tight when removing them from the drive drawer for the first time.

12. Place the drive into the ESD bag.

13. Firmly hold the new drive by its handle. Using your other hand to support the drive (be careful not to touch the PCB components), lower it into the drive slot in the drive drawer as shown in Figure A-27.

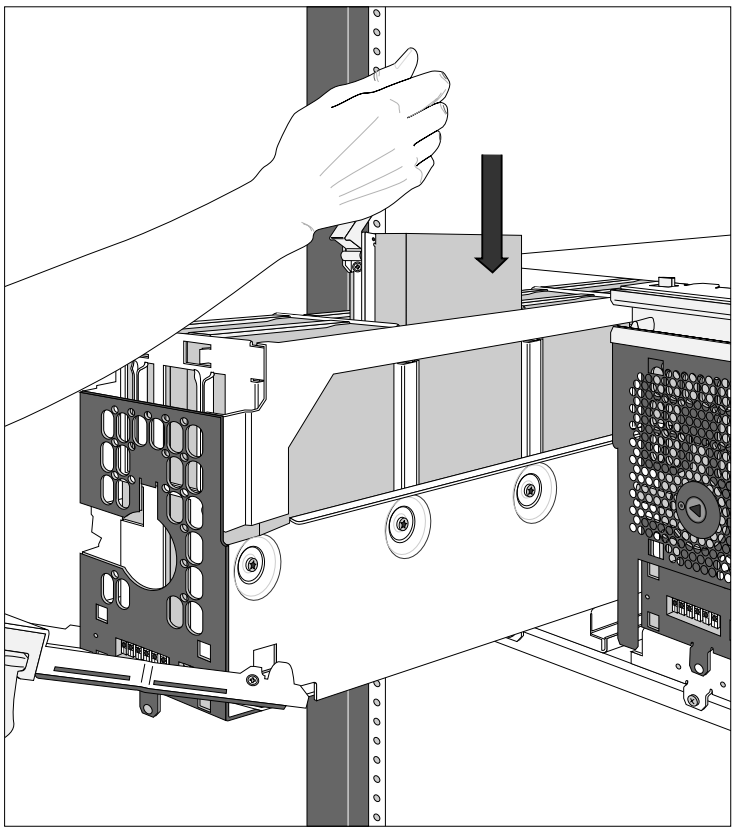


Figure A-27. Inserting a drive in a drive drawer

14. Seat the drive into position by firmly but gently pressing down on the handle.

    Drives install in only one direction. If the drive you are installing does not slide in easily, remove the drive and try again. Make sure the drive is in the correct position, as shown in Figure A-27.

15. Secure the drive using the retaining clip provided on the drive drawer frame (see Figure A-25 on page A-28).

Caution: If the handle is not secured with the retaining clip, the handle may stick up and stop the drawer from being closed, thereby jarring the drawer and possibly damaging a spinning drive.

16. Slide the drawer back into the slot until it is about 3/4-inch from the HDDA chassis, as shown in Figure A-28.

Note: Be sure that the drawer faceplate is pulled down far enough to allow the cam lever at the bottom of the faceplate to clear the chassis. Once in position, the cam lever provides the cam action that firmly seats the drawer into the chassis once it is closed.

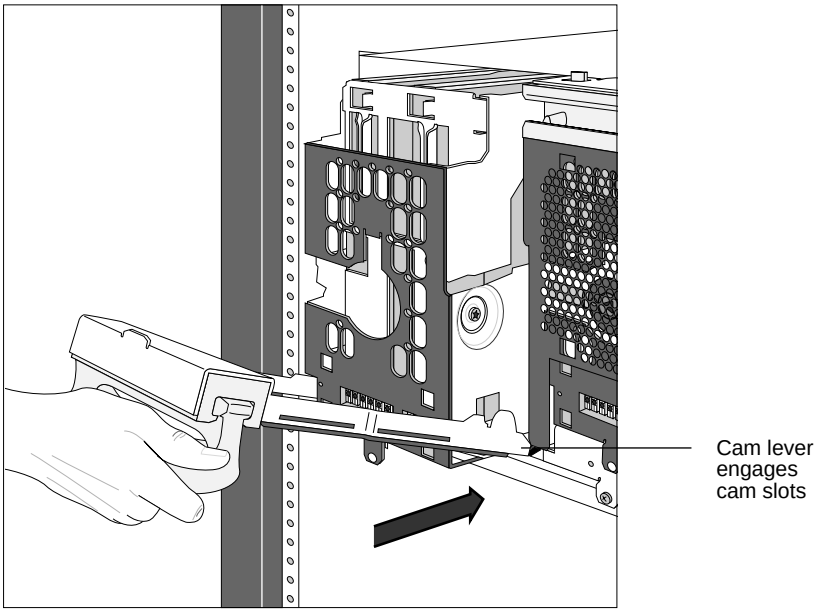


Figure A-28. Closing the HDDA drive drawer

Caution: Do not force the drive drawers into the drive drawer slots; doing so will damage the unit.

17. Push the drawer handle up so that the cam lever engages the cam slots in the HDDA chassis, as shown in Figure A-29.

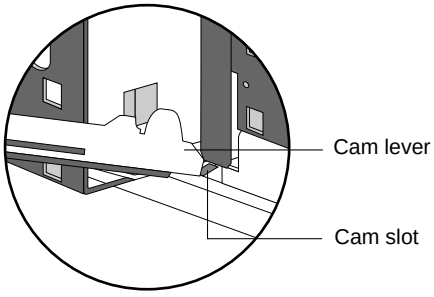


Figure A-29. Cam lever engaging in cam slot

18. Seat the drive drawer firmly into the drawer slot by pressing the handle closed, as shown in Figure A-30. The caming action of closing the handle seats the drive drawer properly.

    The drawer latch at the top left corner of the drive drawer clicks into position when the drawer is properly seated.

    Caution: Do not force the drive drawers into the slots; doing so will damage the unit. If the drawer is not seated properly, move the handle to release the drawer latch, pull the drawer out, and try again.

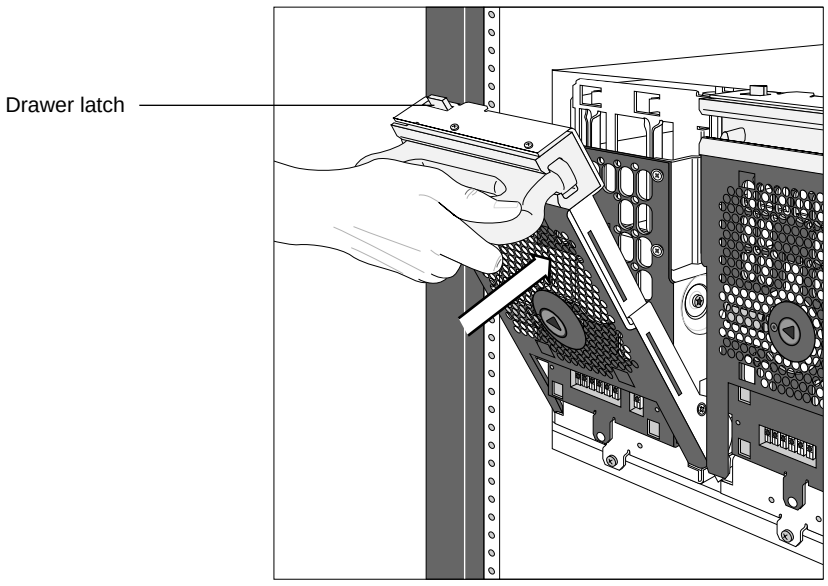


Figure A-30. Latching the HDDA drive drawer

    If the NetServer is powered off, repeat step 7 through step 18 for each drive you want to replace, then skip to step 20.

19. Press the Return key on the system console. The system responds:

```
ad8: removed
ad8: <SEAGATE ST15150N          4611; 4094 MBs>
added device 8.
```

    If you are replacing multiple drives, the system prompts you to replace the next drive now. Repeat step 7 through step 19 for each drive you want to replace.

20. Insert the drive drawer key and lock each drawer by turning the key clockwise, as shown in Figure A-31. Make sure you lock all of the drawers that you unlocked during this procedure.

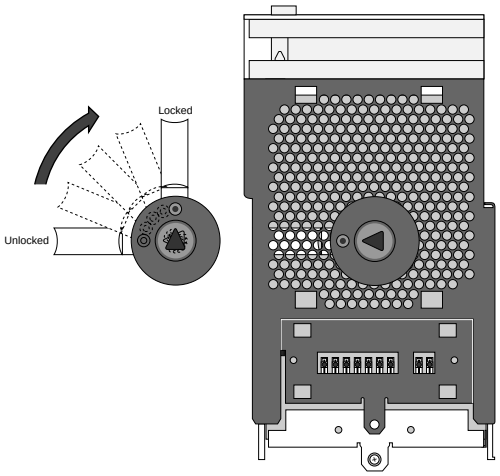


Figure A-31. Locking the HDDA drive drawer

This completes the procedure for replacing a drive in a drive drawer.

B Cable Specifications

About This Appendix

This appendix lists the supported signals for the system console cable and SCSI port on the HP. It also illustrates the SCSI cable connections between the base cabinet and the expansion cabinet and provides specifications for Ethernet, FDDI, MLT-3, and ATM network cables.

The following sections are covered in this appendix:

- System Console Cable
- HP SCSI Port
- Connecting SCSI Cables
- Network Cable Specifications

System Console Cable

Figure B-1 shows the wiring of the system console cable and the supported signals.

Note: Because the system console cable and modem cable are wired differently, the two cables are not interchangeable.

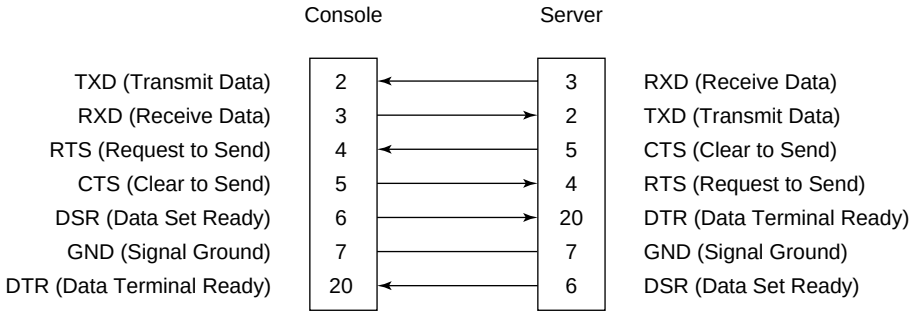


Figure B-1. Pin diagram for system console cable

HP SCSI Port

The HP SCSI port supports up to seven SCSI-2 connections. Table B-1 shows the pin diagram for SCSI-2 connectors.

Table B-1. Pin diagram for SCSI-2 connectors

Signal	Pin
GND (Ground)	1 through 11
GND (Ground)	15 through 25
$\overline{\text{SD0}}$ (SCSI Data0)	26
$\overline{\text{SD1}}$ (SCSI Data1)	27
$\overline{\text{SD2}}$ (SCSI Data2)	28
$\overline{\text{SD3}}$ (SCSI Data3)	29
$\overline{\text{SD4}}$ (SCSI Data4)	30
$\overline{\text{SD5}}$ (SCSI Data5)	31
$\overline{\text{SD6}}$ (SCSI Data6)	32
$\overline{\text{SD7}}$ (SCSI Data7)	33
$\overline{\text{SDP}}$ (SCSI Parity)	34
GND (Ground)	35 and 36
TRMPWR (Terminator Power, +5-volt DC, fused, 2 Amps)	38
GND (Ground)	40
$\overline{\text{ATN}}$ (Attention)	41
$\overline{\text{BSY}}$ (Busy)	43
$\overline{\text{ACK}}$ (Acknowledge)	44
$\overline{\text{RST}}$ (Reset)	45
$\overline{\text{MSG}}$ (Message)	46
$\overline{\text{SEL}}$ (Select)	47
$\overline{\text{CD}}$ (Command/Data)	48
$\overline{\text{REQ}}$ (Request)	49
$\overline{\text{I/O}}$ (Input/Output)	50

Connecting SCSI Cables

This section describes how to connect SCSI cables from the drive rack and HDDAs to the SP boards in the card cage.

For the NS 7000/800 base cabinet and expansion cabinet, there is a one-to-one SCSI connection between the drive rack and HDDA drive drawers and the SCSI ports on the SP board.

Figures B-2 and B-3 show examples of SCSI cabling for the base cabinet and expansion cabinet.

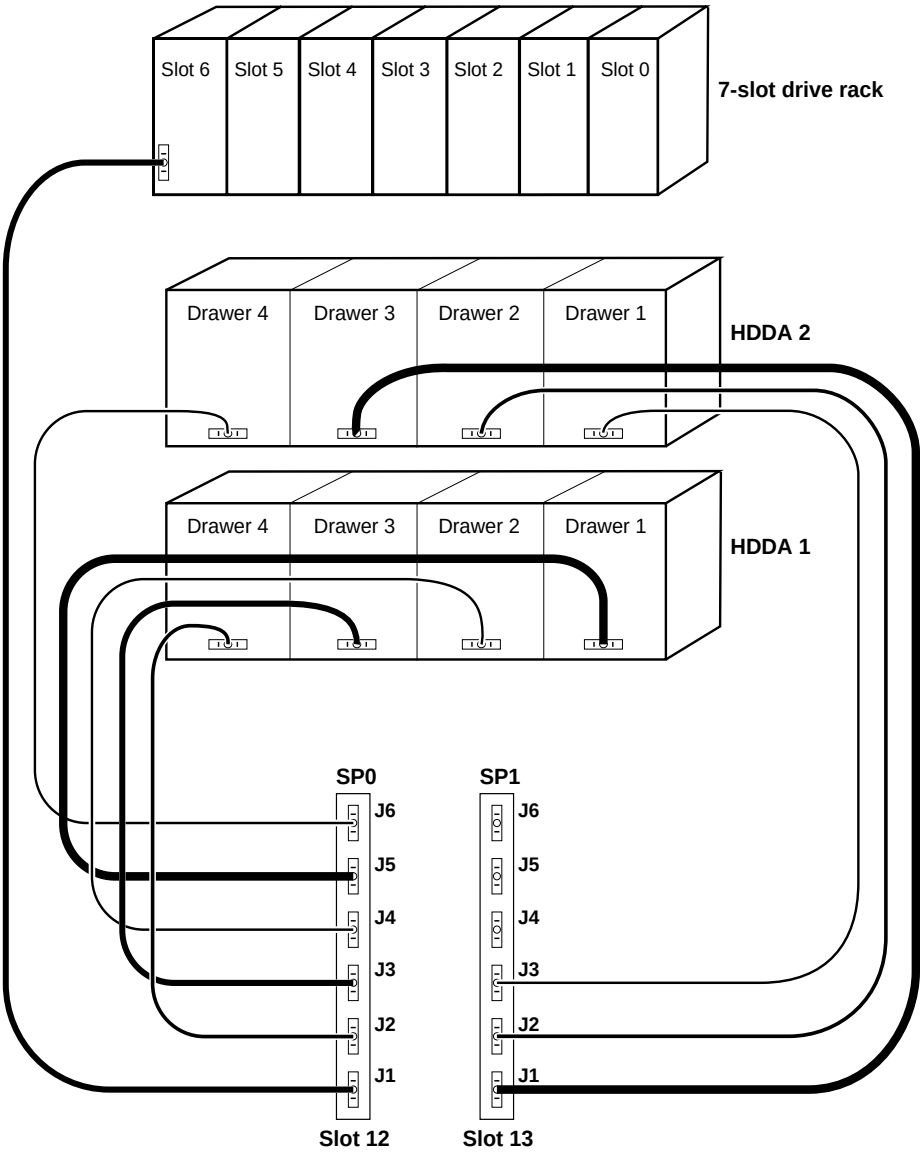


Figure B-2. Base cabinet SCSI cabling (back view)

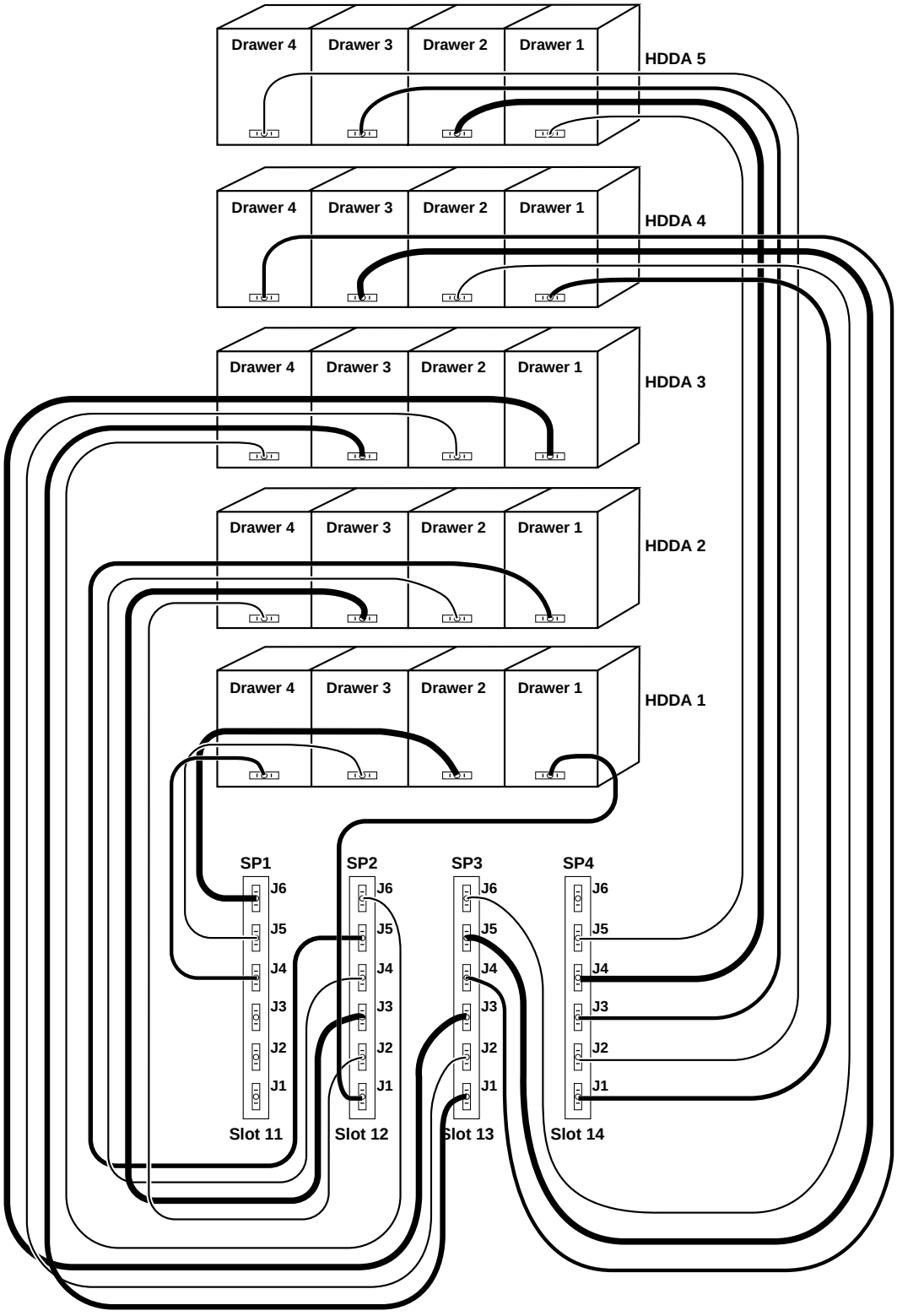


Figure B-3. Expansion cabinet SCSI cabling (back view)

Network Cable Specifications

The following network cable specifications are provided for reference only. Auspex does not supply network cables.

Ethernet

Ethernet connectors use data grade, Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP) cables with RJ-45 connectors; or fiber cables with Media Independent Interface (MII) connectors.

ATM

ATM fiber connectors use 155-Mbps, multimode, OC-3 fiber cables with SC-type connectors, or UTP, category 5 cables with RJ-45 connectors. If your site uses ST-type connectors, you need ST-to-SC converters.

FDDI

FDDI connectors use 50–125-micron, multimode, category 5 cables with standard FDDI MIC connectors; or category 5, STP or UTP cables with RJ-45 connectors.

Recommendation: Auspex recommends using cables with EIA / TIA 568B wiring.

Table B-2 lists the cable pin and pair assignments for EIA / TIA 568B cable connectors.

Table B-2. EIA/TIA 568B cable pin and pair assignments

Pin	Pin	Pair	Color
1	8	2	white/orange
2	7	2	orange
3	6	3	white/green
4	5	1	blue
5	4	1	white/blue
6	3	3	green
7	2	4	white/brown
8	1	4	brown

C Configuring the System Console

About This Appendix

This appendix covers the following sections:

- System Console Parameters
- Using Diacritics for Key Functions

For additional console setup information, refer to the console user's manual.

Note: The following procedures require you to access the Terminal Setup menu by pressing the Caps Lock and Print Screen / Sys Rq keys simultaneously. If this does not work, you can access the Terminal Setup menu by powering off the terminal, powering it on again, and pressing the F3 key.

System Console Parameters

The system consoles shipped with Auspex NetServers are preconfigured with the correct parameters, therefore, they do not require additional setup. However, if you need to reset the parameters on the system console, use the following procedure.

To reset the parameters on the system console

1. Press the Caps Lock and the Print Screen / Sys Rq keys simultaneously to display the Terminal Setup menu. The currently selected field, **Actions**, is highlighted.

Note: Use the Up and Down Arrow keys to select another line on the screen. Use the Right Arrow key to select a submenu. Use the Left Arrow key to return to the previous menu.

2. Use the Right and Down Arrow keys to select **Restore factory defaults,** and press the Enter key.
3. Use the Left Arrow key to return to the main menu. Select **Save settings,** and press the Enter key.
4. Select **Exit Setup,** and press the Enter key.

This completes the procedure for resetting the parameters on the system console.

Break Function

To enter a break on the NetServer system console, press the Caps Lock and Pause / Break keys simultaneously. This factory default setting cannot be disabled. However, you can add a different keystroke for the break function, using the following procedure.

To enable the Break key on the system console

1. Press the Caps Lock and Print Screen / Sys Rq keys simultaneously to display the Terminal Setup menu.

Note: Use the Up and Down Arrow keys to select another line on the screen. Use the Right Arrow key to select a submenu. Use the Left Arrow key to return to the previous menu.

2. Select **Keyboard,** and press the Right Arrow key.
3. Select **Define key,** and press the Enter key.
4. At **Press key to be defined,** press the Pause / Break key.
5. Use the Down Arrow key to select **Unshifted** under the **Modifiers** field, and then press the Right Arrow key to enter the Select function menu.

Note: You may choose another key combination, such as **Shifted**, to represent the Break function. **Unshifted** is used as an example.

6. Use the Up Arrow key, and select **Break**.
7. Press the Enter key.

8. Use the Left Arrow key to return to the **Modifiers** field.
9. Use the Down Arrow key to select **OK,** and press the Enter key.
10. Select **Save settings,** and press the Enter key.
11. Select **Exit Setup,** and press the Enter key.

This completes the procedure for enabling the Break key on the system console.

To disable the Break key on the system console

1. Press the Caps Lock and Print Screen / Sys Rq keys simultaneously to display the Terminal Setup menu.

Note: Use the Up and Down Arrow keys to select another line on the screen. Use the Right Arrow key to select a submenu. Use the Left Arrow key to return to the previous menu.

2. Select **Keyboard,** and press the Right Arrow key.
3. Select **Define key,** and press the Enter key.
4. At **Press key to be defined,** press the Pause / Break key.
5. Use the Down Arrow key to select **Unshifted** under the **Modifiers** field, and then press the Right Arrow key to enter the Select function menu.

Note: You may choose another key combination, such as **Shifted**, to represent the Break function. **Unshifted** is used as an example.

6. Use the Up Arrow key, and select **No function**.
7. Press the Enter key.
8. Use the Left Arrow key to return to the **Modifiers** field.
9. Use the Down Arrow key to select **OK,** and press the Enter key.
10. Select **Save settings,** and press the Enter key.
11. Select **Exit Setup,** and press the Enter key.

This completes the procedure for disabling the Break key on the system console.

Delete Key

The Delete key on the NetServer system console does not work properly if you use a different *.login* file other than the standard *.login* file supplied with your system.

In order for the Delete key to work properly, you must include one of the following commands in your nonstandard *.login* file:

```
stty dec
```

or

```
stty erase ^?
```

PgUp and PgDn Keys

The PgUp and PgDn keys on the NetServer system console are not configured to work with the **vi** editor. Use the following procedure to configure the PgUp and PgDn keys to work with the vi editor.

To configure the PgUp and PgDn keys for vi editor

1. Press the Caps Lock and Print Screen / Sys Rq keys simultaneously to display the Terminal Setup menu.

Note: Use the Up and Down Arrow keys to select another line on the screen. Use the Right Arrow key to select a submenu. Use the Left Arrow key to return to the previous menu.

2. Select **Keyboard,** and press the Right Arrow key.
3. Select **Define key,** and press the Enter key.
4. When asked **Press key to be defined,** press the PgUp or PgDn key.
5. Use the Down Arrow key to select **Unshifted** under the **Modifiers** field, and then press the Right Arrow key to enter the Select function menu.
6. Select **UDK sequence,** and press the Enter key. The **UDK:** field appears.
7. Press Ctrl-B for the PgUp function or Ctrl-F for the page down function according to your selection in step 4.
8. Use the Down Arrow key to select the **Apply** field.
9. Use the Left Arrow key to select **OK,** and press the Enter key.
10. At this point, you have configured one of the PgUp and PgDn keys. Repeat steps 2 through 9 to configure the second key.
11. Select **Save settings,** and press the Enter key.
12. Select **Exit Setup,** and press the Enter key.

This completes the procedure for configuring the PgUp and PgDn keys for the NetServer system console. Test the PgUp and PgDn keys when you execute the **vi** editor.

Using Diacritics for Key Functions

Auspex recommends that you do not assign diacritics as key functions because they may not function correctly in UNIX. Diacritics are described in the console setup menu under the Define Key Editor as nonspacing accents. Some diacritics include “~” (tilde), “¨” (dieresis), “˘” (breve), and “¸” (cedilla).

AUSPEX

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